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Location-based Comparison of FDG PET and Bone Scan for Detection of Bone Metastasis in Patients with Non-small Cell Lung Cancer

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Purpose: It was reported that FDG PET had better specificity and bone scan had higher sensitivity for detecting bone metastasis. We evaluated diagnostic superiority between FDG PET and bone scan in patients with non-small cell lung cancer according to the location of bone metastasis. **Methods:** In this retrospective study, we reviewed 402 NSCLC patients who were undertaken both FDG PET and bone scan. The intervals between the two studies were less than 1 month. Findings of PET and bone scan were analyzed by a 5-point scale of metastasis: most likely, more likely, equivocal, less likely, least likely. According to the location, bone lesions were grouped into vertebra, pelvis, rib, sternum, scapula, skull, long bone. We diagnosed bone metastasis when it was proven on biopsy or there was consistency (at least three) between the imaging modality and clinical findings. We used imaging modality of X-ray, CT, MRI and follow-up of clinical status or imaging studies over 1 year. **Results:** Fifty-three out of 402 patients with NSCLC were revealed to have lesions of bone metastasis. Distribution of bony metastasis was 33% in vertebra, 31% in rib (inclusion of direct invasion), 15% in pelvis, 8% in long bone, 5% in scapula, 5% in skull, and 3% in sternum. In lesion-group analysis, 98 out of 281 lesion groups were considered as metastasis. The overall sensitivity, specificity, and accuracy of FDG PET were 67%, 92%, and 83% and those of bone scan were 67%, 67% and 67% respectively. FDG PET was more sensitive than bone scan in region groups of vertebra, pelvis and long bone. On the other hand, bone scan was more sensitive than FDG PET in those of rib, skull, and scapula. **Conclusion:** The overall diagnostic accuracy of FDG PET in detecting bone metastasis was superior to bone scan in patients with non-small cell lung cancer. In location-based analysis, FDG PET was more sensitive than bone scan in region groups of vertebra, pelvis and long bone. Bone scan was only more sensitive in region groups of rib, skull, and scapula.

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Significance of Small Pulmonary Nodules with Negative or Minimal ^{18}F-FDG Uptake on PET-CT Images of Patients with Non-thoracic Malignancies

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Purpose: Small pulmonary nodules with little or no fluorodeoxgyglucose (FDG) uptake are relatively common findings in PET-CT images of patients with non-thoracic malignancies. Interpreting the presence of such nodules is often a diagnostic challenge, and this study aims to examine their significance. **Methods:** Cases with pulmonary nodules less than 1 cm in diameter showing no FDG uptake or uptake less than the mediastinal background were reviewed. Nodules with findings indicating benign nature, such as calcification or elongated shape were excluded. Total of 69 cases had sufficiently long clinical follow-up period (average 187 days) with additional chest images or biopsy results. The cases were divided first by the presence or absence of other accompanying lung abnormalities such as tuberculosis scars or other inflammatory lesions, and secondly by the presence or absece of FDG uptake. The incidences of metastases were compared between the two group pairs. **Results:** Of the 69 cases, ten proved to be metastastic nodules (14.5%). Eight of the 52 FDG negative cases (15.4%), and 2 of the 17 cases with faint FDG uptake (11.8%) were metastases. No statistically significant difference was noted between the group with and the group without accompanying lung lesions. **Conclusion:** Over 14% of incidental, small lung nodules with FDG uptake less than the mediastinal background turned out to be hematogenous lung metastases when no findings exclusive to benign nature could be found. Thus, when such nodules are seen on PET-CT images performed for the staging of extra-thoracic malignancy, close follow-up is mandatory.