Clinical Impact of \(^{18}\)F-Fluorodeoxyglucose Positron Emission Tomography in Patients with Lung Cancer: Experience of Linko Chang-Gung Memorial Hospital

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Purpose: This retrospective study was to evaluate the clinical usefulness of \(^{18}\)F-fluoro-2-deoxy-D-glucose positron emission tomography (FDG-PET) in patients who had suspicious or proven lung cancers with curative intent.

Methods: Between January 2001 and May 2004, consecutive patients who had suspicious or proven lung cancers with curative intent and had a FDG-PET scan in our hospital were enrolled. The including criteria were at least one of the follows: (1) had an indeterminated solitary pulmonary nodule (SPN) in chest X-ray (CXR) or chest computed tomography (CT); (2) had histologically proven lung cancer with clinically stage I\(\text{IIIb}\); (3) had suspicious or proven recurrent/residual lung cancer. Patients who did not meet the following criteria were excluded: (a) was not followed up for more than 6 months after PET scan (b) had the history of second cancers and the possibility of pulmonary metastases could not be ruled out (c) had incomplete chart or image records. The diagnostic criterion was tissue proven or clinical follow up. Finally, 53 patients were included in this study (mean age 58 years, 37 male and 16 female). Ten were criteria 1, 27 were 2, and 16 were 3.

Results: In all (patient-based), the sensitivity, specificity, accuracy, positive predictive value and negative predictive value of FDG-PET vs. conventional images were 93.3\% vs. 37.9\%, 66.7\% vs. 94.7\%, 83.3\% vs. 60.4\%, 82.4\% vs. 91.7\%, and 85.7\% vs. 50.0\%, respectively. For criteria 1, FDG-PET correctly ruled out the possibility of malignancy in 7 patients. However, 3 (30\%) false-positives were found. Two (66.7\%) were due to tuberculosis. As for criteria 2, FDG-PET confirmed the findings in conventional images in 17 (62\%) patients and disclosed unexpected lesions in 10 (38\%) patients. 16 (59\%) patients changed their stage and 14 changed (50\%) treatment planning. For criteria 3, four (25\%) were proven to be disease-free, 9 (56\%) were confirmed to have recurrent/residual disease, and 3 (20\%) were found to have unexpected lesions after PET. Twelve patients (75\%) changed their treatment planning. Overall, PET ruled out possible lesions in 20\% (11/53) of patients and confirmed the findings of conventional images in 50\% (26/53) of patients. It also discovered unexpected lesions in 25\% (13/53) of patients. Twenty (40\%) patients’ stage and 26 (50\%) patients’ treatment were altered due to FDG-PET.

Conclusion: FDG-PET had a higher sensitivity and negative predictive value for lung cancer patient with curative intent than conventional images. It is especially useful in detecting unexpected distant metastases or residual/recurrent disease.

Key words: lung cancer, FDG, PET