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## Evaluation of pulmonary lesions with $^{18}$FDG CoDe PET : Comparison with CT, MRI and clinical findings

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Dual-head gamma camera coincidence (PET) is one of the recent approaches to overcome the problems of the dedicated PET scans such as high cost and limited availability. The purpose of this study was to evaluate the accuracy of $^{18}$FDG coincidence detection(CoDe) PET in differentiating benign from malignant lesions and staging malignancy. Thirty-one patients with pulmonary lesions underwent $^{18}$FDG CoDe PET. Patients were prepared for the study by overnight fasting. The images were acquired at about 1 hr postinjection of 3-10 mCi $^{18}$FDG intravenously using dual head gamma camera (Elscint, Varicam) equipped with 5/8 inch thick NaI crystal. The images were analyzed visually. Pathologic proof of diagnosis was obtained by aspiration biopsy in 24 patients and by operation in 7 patients. Among 25 patients with pathologically proven malignant lesions (11 adenocarcinoma, 3 non-small cell lung cancer, 5 squamous cell cancer, 4 small cell lung cancer, 1 invasive thymoma and 1 adenosquamous cell cancer), $^{18}$FDG CoDe PET could not detect only 1 lesion which was adenocarcinoma of less than 1 cm in size. In seven patients underwent lobectomy, 6 CoDe PET studies agreed with pathologic results. Whereas only 3 of 7 patients CT findings agreed with pathologic findings. However, 6 patients with benign lesions also showed positive FDG uptake. The false positive pathologies were due to tuberculosis, pneumonia, and granulomatous changes due to silicosis. $^{18}$FDG CoDe PET was sensitive in the evaluation of lung lesions but was not specific for malignancy. $^{18}$FDG CoDe PET was more sensitive than CT in nodal staging in limited number of patients studied thus far.

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## Brain Tumor Imaging with Tc-99m Tetrofosmin SPECT: Comparison with Tl-201 and Tc-99m MIBI SPECT and [F-18]Fluorodeoxyglucose PET

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The uptake of Tc-99m tetrofosmin (TF) has been demonstrated in various extracerebral tumors. The purpose of the present study was to assess the ability of Tc-99m tetrofosmin (TF) to predict tumor malignancy and to compare its uptake with that of Tl-201, Tc-99m MIBI and F-18 FDG in brain tumors.

Tc-99m TF SPECT imaging was performed in 22 patients with brain tumors (6 low grade gliomas, 9 high grade gliomas, 4 malignant non-gliomas and 3 other tumors) and 3 healthy controls. Parts of the patients underwent Tl-201 (n=12) and Tc-99m MIBI SPECT (n=14) and F-18 FDG PET (n=12). The radioactivity ratio of tumor to contralateral normal tissue (T/N) and the ratio of tumor to contralateral white matter (T/WM) were calculated in SPECT and PET images, respectively. In healthy controls, Tc-99m TF uptake was seen only in scalp, in the choroid plexus and pituitary gland, but never in normal cerebral parenchyma. On visual examination of Tc-99m TF SPECT images, high grade gliomas and malignant non-gliomas exhibited a high Tc-99m TF uptake and were easily differentiated from low grade gliomas. TF T/N in low grade gliomas (2.8 $\pm$ 0.4) was significantly lower than that in high grade gliomas (22.5 $\pm$ 29.8) and malignant non-gliomas (8.3 $\pm$ 2.8) without overlap of values ($p = 0.003$ and $p = 0.014$, respectively). TF T/N was significantly correlated with MIBI T/N (rho = 0.92, $p = 0.001$), Tl T/N (rho = 0.72, $p = 0.017$), and FDG T/WM (rho = 0.65, $p = 0.031$). There was an excellent agreement between TF T/N and MIBI T/N values on linear regression analysis (MIBI T/N = - 0.63 + 0.97 $\times$ TF T/N).

These preliminary results indicate that SPECT imaging with Tc-99m TF may be useful for the noninvasive grading of brain tumors. They also suggest that Tc-99m TF and Tc-99m MIBI may accumulate in brain tumors by a similar mechanism or in relation to a similar process of tumor cell proliferation.