1112 POSTER

The effect of irradiation on the sensitivity and specificity of FDG-PET to detect post-irradiation recurrence in cervical cancer patients

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Background: To investigate the effect of previous irradiation (RT) on the sensitivity, specificity, true (false) positive (negative) value and Standard Uptake Value (SUV) of FDG-PET in cervical cancer patients with post-RT recurrence.
Material and Methods: There were 97 previously irradiated recurrent cervical cancer patients being analyzed with respect to clinical factors including age, pathology, Figo stage, treatment methods, recurrent sites by location and previous RT dose in effecting aforementioned value of FDG-PET to detect recurrence. Previous RT dose can be divided into high (primary lesion sites receiving tele- and brachytherapy), low (regional lymphatic draining sites receiving teletherapy only) and non-RT areas.
Results: Most of clinical factors yield no significant impact on either sensitivity or specificity of FDG-PET. There was a significant difference in specificity between previously non-RT mediastinal lymph node and thoracic spine: 67/73 (91.8%) vs. 95/95 (100%), $p = 0.006$. Recurrent rates by anatomic sites revealed a significantly higher PET documented recurrent rate at paraaortic lymphatic region: 34 (35%) than did at peritoneam (9.3%), bone (2.1%), liver (5.2%) and lung (9.3%) ($p = 0.000$). Recurrent rates by RT dose revealed, however, no significant difference among high dose, low dose and non-RT area in term of PET (+) (22.7% 13.9% and 11.9%, $p = 0.151$), PET (−) (71.1%, 77.2% and 79.6%, $p = 0.108$), false (+) (3.1%, 6.9% and 6.7%, $p = 0.840$) and false (−) rates (3.1%, 1.9% and 1.8%, $p = 0.908$). SUV at cervix, vagina & parametria which corresponded to previously high dose area yield a significantly higher SUV than low dose or non-RT area did (2.45 ± 5.63 vs. 1.39 ± 2.95 or 1.31 ± 3.29, $p = 0.010$)
Conclusions: PET documented recurrent rates correlate well to anatomic sites but not previous RT dose. A significantly high SUV corresponded to areas receiving previously high RT dose. This does not translate into high recurrent rates mainly due to a relatively high mean SUV (9.73 ± 7.96) required to document PET (+) cases. Mean SUV for PET (+) low dose and non-RT areas were 5.91 ± 3.75 and 6.04 ± 4.27.

1113 POSTER

Thallium-201 single photon emission computed tomography assessment in the detection of recurrent glioma and ependymoma.

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Background: To establish the diagnostic accuracy of thallium-201 single-photon emission computed tomography (^{201}Tl-SPECT) in the detection of recurrences in the follow-up of patients with astrocytic and ependymal supratentorial tumors after treatment.
Patients and methods: From October 1999 to November 2003, 63 ^{201}Tl-SPECT procedures were performed in 36 patients (12 males and 24 females; median age of 46 ± 13 years). Tumour histologies included, high grade glioma in 19 patients (15 multiform glioblastoma and 4 anaplastic astrocytoma); 2 oligoastrocytomas, 11 oligodendroglioma and 4 ependymoma. Because of the heterogeneity of tumor histology, the sample was dichotomized resulting in 19 high grade glioma and 17 low grade neuroepithelial tumors. All patients underwent surgery (13 complete resection, 13 partial resection and 10 biopsy) and adjuvant radiotherapy (mean dose of 60 Gy and 54 Gy for high and low grade tumors respectively). Eighteen patients also received chemotherapy. Follow up was performed every 3 months with morphological imaging (CT and IMR). When recurrence or progression was suspected, ^{201}Tl-SPECT was performed. Whole group median follow-up was 18.3 ± 14 months. ^{201}Tl-SPECT was started 60 minutes after intravenous injection of 180 mBq of Thallium; a dual-head gamma camera was used. Images were reconstructed with filtered backprojection (Butterworth 0.5/4). ^{201}Tl-SPECT information was correlated with clinical and imaging features. At least four month follow up after the SPECT was taken in account to state a result as a true positive. Overall survival was calculated by the Kaplan-Meier estimates. Breslow and the log-rank tests were used for univariate analysis.
Results: Sensitivity and specificity of ^{201}Tl-SPECT in recurrence detection was 0.88 and 1.0 respectively. Accuracy rate was 93%. Sensitivity and specificity for high grade tumours, were both 1.0. Sensitivity for low grade tumors was 0.78 because of 4 false negative. Two year overall survival was 18% and 74% for the positive and negative ^{201}Tl-SPECT group respectively. ($p = 0.0003$)
Conclusions: ^{201}Tl-SPECT is a valuable and non invasive diagnostic tool in the detection of recurrence or progression disease in patients treated with radiotherapy for gliomas and supratentorial ependymomas. There is a close relationship between, tumor grade,^{201}Tl-SPECT results and patients survival. However, more studies are warranted to further explore the real diagnostic potential.

1114 POSTER

The impact of F-18 FDG PET in primary bone lymphoma: comparison with MRI

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Objectives: Primary lymphoma of bone (PLB) is one of the rarest primary bone malignancies, described as a distinct entity called reticulum cell sarcoma, and the main treatment modality is chemotherapy, which is a far from other primary bone tumor. We evaluated the clinical impact of F-18 FDG PET (PET) in the PLB.
Methods: A survey of 1,422 NHL patients diagnosed at our institute from 1989 and 2003 were identified 28 patients with PLB (2.0%) and 18 patients (42, range: 16–74). who wer performed PET study were enrolled. Attenuated corrected whole PET images (ECAT EXACT HRf+, advance PET) were reviewed, and the assessment was done using visual grading (definitely higher or iso/lower) and semiquantative (max SUV) methods. Then it compared with the clinicophatological and MRI.
Results: A total of the 92 lesions were evaluated from above 18 patients and direct comparison between PET and MRI available in 81 lesions of these. Comparing with MRI, overall diagnositic value of PET was similar (MRI vs PET; sensitivity 89% vs 81%, specificity 70% vs 82%, NPV 60% vs 53%, PPV 91% vs 94%, accuracy 85% vs 81%). In PET alone, 53 of these were considered benign; 38, equivocal; and 101, malignant or suspicious for malignancy. The undefinitable 32 lesions of MRI only, after the PET added, it were reclassified as normal and/or benign (n 21) or malignant (n 11). The accuracy of these 32 lesions which was reclassified by PET, 78% (sensitivity 72%, specificity 81%)
Conclusions: Compared the MRI, FDG-PET was shown similar diagnostic ability and it was accurately reclassified undefinitable lesions which were detected on MRI alone. FDG-PET was contributed in mangement of PBL.

1115 POSTER

Accuracy of positron emission tomography for diagnosis of pulmonary lesions with low 18F-fluorodeoxyglucose uptake less than 2.5 in standardized uptake value

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Background: Differentiation between benign and malignant pulmonary lesions in ^{18}F-fluorodeoxyglucose positron emission tomography (FDG PET) has been commonly accomplished by using a semi-quantitative criterion for FDG uptake of 2.5 in standardized uptake value (SUV). However, malignancies <2.5 in SUV are frequently encountered, and thus pulmonary nodules with low FDG uptake are often diagnostic challenges.
Materials and methods: Among consecutive 360 patients who underwent FDG PET for evaluation of pulmonary nodules or masses on CT, we retrospectively analyzed 49 patients with pulmonary lesions (excluding ground-glass opacity or infiltrative ones) <2.5 in SUV. FDG uptake was determined by visual scoring (absent, faint, moderate or intense, compared with mediastinal uptake), and two semi-quantitative methods, including SUV and CR (contrast ratio, defined as lesion uptake minus contralateral normal lung uptake divided by the sum of these uptakes, according to Nomori et al.). Final classification was based on histopathological findings or clinical and radiological follow-up. The ROC curve analysis was applied to determine optimal cut-off criteria and diagnostic accuracies.
Results: The lesions consisted of 14 malignant (diameter, 8–32 mm) and 35 benign (7–36 mm) ones. Prevalence of malignancy was 29%. Visual FDG uptake $\geqslant$faint correctly identified 12 of 14 malignancies, and was falsely positive in 15 of 35 benign lesions. Sensitivity was 86%, specificity 57%, positive predictive value 44%, and negative predictive value 91%. Semi-quantitative SUV >1.48 correctly detected 12 of 14 malignancies, and was falsely positive in 10 of 35 benign lesions. Sensitivity was 86%, specificity 71%, positive predictive value 55%, and negative predictive value 92%. CR >0.28 correctly diagnosed 10 of 14 malignancies and was falsely