the planning target volume (PTV). No correction for organ movement was incorporated and no elective nodal irradiation performed. Each of the different volumes were compared before and after 50−60 Gray. Two plans were then created and compared: 78 Gy delivered to the initial PTV and 66 Gy to the initial PTV with a 12 Gy boost to the post 50/60 Gy PTV.
Results: All patients (mean age 64 years) had stage III disease (4 IIIA and 6 IIIB). There were 4 squamous cell and 6 adeno-carcinomas. After 50/60 Gray the GTVCT, GTVPET, GTVCT+PET and PTV reduced by a mean of 22%, 43%, 30% and 22% respectively. The delivery of 78 Gray to the initial PTV could have been safely achieved in 4/10 patients. Of these delivering treatment in two phases would have substantially spared normal tissue in 2 patients. In the remaining 6 patients, delivering 78 Gray to the initial PTV would have exceeded normal tissue constraints and no benefit was seen when planned in 2 phases.
Conclusions: The PTV, consequent on changes seen on PET-CT, reduces during a course of radical radiotherapy for NSCLC. Such a reduction permits dose escalation in a subset of patients and may lead to improved therapeutic outcomes.
This project was supported by the German Federal Ministry of Education and Research (BMBF 03ZIK/OncoRay)

1010 POSTER

Positron emission tomography and computed tomography in detection of pelvic recurrence in patients with rectal cancer

V. Nemtsova. *Kharkov Medical University, Oncology, Kharkov, Ukraine*

Objective: The aim of this study was to assess diagnostic accuracy of combined positron emission tomography (PET) and computed tomography (CT) in detection of pelvic recurrence in patients with rectal cancer who underwent abdominoperineal or anterior resection.
Methods: Fifty-four patients were included (31 males and 23 females). Fourteen patients underwent abdominoperineal resection and 40 underwent anterior resection with an anastomosis in the pelvic region before referral for PET/CT. Pelvic sites of fluorine-18 fluorodeoxyglucose (FDG) uptake were rated separately on PET and PET/CT images as benign or malignant on the basis of shape, location, and intensity of fluorine-18 FDG uptake (1−2 = benign and/or physiologic, 3 = equivocal, 4−5 = malignant). Altered pelvic anatomy and presence of presacral abnormalities were examined with CT. Pelvic recurrence was confirmed with histologic analysis or clinical and imaging follow-up. Sensitivity, specificity, positive and negative predictive values, and accuracy of PET and PET/CT in the detection of pelvic recurrence were compared with lesion- and patient-based analyses by using the chi(2) test. Clinical relevance of PET/CT assessment was determined.
Results: Of 76 pelvic sites with increased fluorine-18 FDG uptake, 39 were determined as malignant. Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy for differentiating malignant from benign fluorine-18 FDG uptake in the pelvis were 97%, 95%, 91%, 96%, and 94% for PET/CT and 81%, 64%, 75%, 73%, and 72% for PET, respectively. The physiologic fluorine-18 FDG uptake in displaced pelvic organs was the most common cause for false-positive interpretation of PET findings. Presacral CT abnormalities were present in 25 (46.3%) of 54 patients, and 5 (20%) abnormalities were malignant. PET/CT was used to distinguish benign and malignant presacral abnormalities with a sensitivity, specificity, positive predictive value, and negative predictive value of 100%, 97%, 86%, and 100%, respectively. PET/CT findings were clinically relevant in 24 (45%) of all patients.
Conclusion: PET/CT is an accurate method in the detection of pelvic recurrence in patients with rectal cancer after surgical removal of rectal cancer.

1011 POSTER

The effects of tumour volume coverage on the assessment of vascular activity following radiotherapy in human non-small cell lung cancer using dynamic contrast enhanced computed tomography

Q.S. Ng[1], V. Goh[2], H. Mandeville[3], J. Milner[3], M.I. Saunders[3], P.J. Hoskin[3]. *[1]National Cancer Centre, Department of Medical Oncology, Singapore, Singapore; [2]Mount Vernon Cancer Centre, Paul Strickland Scanner Centre, Middlesex, United Kingdom; [3]Mount Vernon Cancer Centre, Marie Curie Research Wing, Middlesex, United Kingdom*

Background: Volumetric dynamic contrast enhanced computed tomography (CT) can be used to quantify whole tumour vascular function and has been shown to improve measurement reproducibility compared to conventional single level techniques. We aim to determine if whole tumour assessment provides a more representative evaluation of the tumour vascular changes following radiotherapy in lung cancer.
Methods: Following ethical approval and informed consent, 16 patients (9 males, 7 females) with non-small cell lung cancer (mean tumour size 7.6 cm; range 4.9 to 11.8 cm) receiving palliative radiotherapy underwent volumetric dynamic CT examinations. Using 16-detector CT, multiple sequential volumetric acquisitions encompassing the entire tumour were acquired after IV contrast infusion. Median values of tumour blood volume (BV; mL/100 mL) were measured for the whole tumour, and multiple contiguous 10 mm tumour slices, Scans were performed twice at baseline, and once after two fractions (9 Gy total dose) of radiotherapy. Mean vascular changes after radiotherapy were compared using Bland-Altman 95% limits of agreement, derived from the two baseline scans, and paired t-testing.
Results: At baseline, mean BV was 6.2 ml/100 mL and 5.8 ml/100 mL with whole tumour and 10 mm level measurements respectively. With whole tumour measurement, mean BV increased by 21.5% (paired t-test, $p = 0.025$) after two fractions of radiotherapy, which was greater than the 95% limits of change. With 10 mm tumour measurement, BV change was spatially variable: 8 of the 16 patients had significant changes in BV (paired t-test, $p < 0.05$) after radiotherapy, of which, only 4 patients had changes greater than the 95% limits of change. The remaining 8 patients demonstrated variable BV changes depending on the tumour slice position where the measurements were taken from, these changes were within the 95% limits of change and were not significant on paired t-testing ($p > 0.05$).
Conclusion: Tumour vascular changes after radiotherapy are spatially heterogeneous. Conventional single level imaging techniques might not provide an accurate depiction of these changes. When assessing tumour vascular changes following therapy, whole tumour volumes should be evaluated if possible.

1012 POSTER

Imapct of FDG-PET/CT imaging in staging and treatment planning for radiotherapy pf head and neck carcinoma

M. Krengli[1], L. Deantonio[1], D. Beldì[1], G. Loi[2], M. Brambilla[2], E. Inglese[3]. *[1]University of Piemonte Orientale, Radiotherapy, Novara, Italy; [2]Hospital Maggiore della Carità, Medical Physics, Novara, Italy; [3]Hospital Maggiore della Carità, Nuclear Medicine, Novara, Italy*

Background: The use of ^{18}F-fluorodeoxyglucose positron emission tomography (FDG-PET) has recently gained interest in radiation oncology in relation to a potential improvement of tumour staging, and a better delineation of the target volume.
The present study aims to analyze the impact of FDG-PET fused with computed tomography (CT) images for the staging and the treatment planning of patients with head and neck carcinoma candidates for primary radiotherapy (RT).
Materials and Methods: From November 2004 to June 2006, 22 patients affected by head and neck carcinoma were enrolled into an institutional FDG-PET/CT imaging protocol: 6 oropharyngeal, 6 hypopharyngeal, 4 nasopharyngeal, 2 oral cavity, 2 laryngeal, 2 paranasal sinus tumors. Patients candidates for combined radio-chemotherapy or RT alone underwent PET/CT and CT simulation for staging and treatment planning purposes.
The “Gross Tumor Volume” (GTV) was contoured first on CT simulation images (CT-GTV), and then on PET images (PET-GTV). Other additional volumes were considered: the composite volume “CT-GTVand PET-GTV”, the volume identified by PET but not by CT (PEToutCT), the volume identified by CT but not by PET (CToutPET), and the average mismatched volume between the two image modalities (CT & PET).
Results: Based on PET/CT, changes in TNM categories and clinical stage occurred in 8/22 patients (36%) and 6/22 patients (27%), respectively. The difference between the mean CT-GTV (20.0 cc, standard deviation 17.8 cc) and PET-GTV (17.2 cc, standard deviation 16.8 cc) was not statistically significant at Wilcoxon test ($p = 0.2$). The mean value of PEToutCT volume was 27% of the CT-GTV. The PEToutCT volume resulted $\geqslant$10% larger than the CT-GTV in 13/22 patients (59%). Based on PET/CT information, the CTV was modified in 4/22 patients (18%).
Conclusions: PET/CT fusion images had a relevant impact on tumor staging leading to a change of TNM categories in 36% and clinical stage in 27% of cases. The GTV identified by PET/CT accounted for 27% of CT-GTV.

1013 POSTER

Periodic stimulation tests in different groups of thyroid cancer patients

I. Fedotova, V. Nemtsova. *Kharkov Medical University, Oncology, Kharkov, Ukraine*

Purpose: Recombinant human thyrotropin-TSH (rhTSH) is used to increase radioiodine uptake during imaging of thyroid cancer. Recurrences are frequent in thyroid cancer patients and long-term follow-up is therefore necessary. In this study we evaluated the yield of rhTSH stimulation in three