groups of patients, classified according to the UICC/TNM risk stratification and the results of first follow-up testing.
Methods: The study population comprised 111 patients referred for rhTSH testing. All had undergone first follow-up testing after thyroid hormone withdrawal [off-T(4)] within 1 year of ^{131}I ablation. Negative first follow-up testing was defined as Tg < 2 ng/ml and no neck uptake on ^{131}I diagnostic whole-body scan. Sixty-eight patients had stage I thyroid cancer and negative first follow-up testing (group I), 17 had stage I disease and positive first follow-up testing (group II), and 26 had stage II-IV disease (group III). RhTSH stimulation was performed an average of 4 years after first follow-up testing.
Results: diagnostic scanning with ^{131}I after rhTSH was negative in all patients of group I. In group II stimulation with rhTSH showed residual Tg in six patients and residual ^{131}I uptake in the thyroid bed in two patients, but anybody from these patients had signs of disease progression. Four patients from group III (15.4%) had a positive rhTSH test result, and this was suggestive of disease progression in at least two cases.
Conclusion: The first follow-up testing is essential for prognostic classification after ^{131}I ablation of thyroid cancer. In stage I patients, undetectable Tg and negative ^{131}I scan 1 year after ablation define a large population of subjects who have a very low risk of recurrence and who do not require further rhTSH stimulation tests. Periodic rhTSH stimulation tests appear useful in higher-risk thyroid cancer patients.

1014 POSTER

Pre-operative staging with Positron Emission Tomography (PET) in patients with pelvic recurrence of rectal cancer

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Background: The treatment of pelvic recurrences of rectal cancer is primarily surgical. The substantial morbidity and mortality of such resections warrant stringent patient selection. Recent literature reports PET to be of additional value to CT for the detection of metastases in colorectal cancer patients.
Methods: In a series of 37 pelvic recurrences PET findings were evaluated retrospectively. Comparison was made to CT and MRI findings. It was analyzed whether PET had been decisive in clinical decision-making or could have been so.
Results: Thirty-two patients had 37 rectal cancer recurrences. PET findings differed from CT and MRI in 13 cases (35%): seven PET scans showed lesions that were not seen with CT or MRI. PET scans were negative in six lesions detected by CT or MRI. PET findings led to changes in management in seven recurrences (19%). Four futile operations were (or could have been) averted based on information from PET scans (11%). Three PET scans were false positive.
Conclusions: In a selected population with pelvic rectal cancer recurrences, PET had additional value to conventional imaging, mainly in detecting lymph node metastases. PET thus had significant impact on selection of patients fit for curative surgery.

1015 POSTER

Analyzing the effects the quality of the images contained in a CT data set has on the accuracy of an automated fusion computer programme for the purposes of Image-Guided Radiation Therapy (IGRT)

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Background: Does the quality of images taken from different technologically advanced CT scanners decreases a computer's ability to accurately determine daily organ movement using an automated fusion process during IGRT.
Materials and Methods: 70 CT data sets were taken from 10 prostate cancer patients during the course of IMRT treatment with IGRT. The two CT scanner models used were an old 1997 scanner and a new 2006 scanner. The IGRT process uses computer software that possesses an automated and manual fusion tool, which aligns a planning CT set with daily treatment CT sets. The initial planning CT is obtained for the purposes of creating the physics treatment plan. The daily treatment CT scans are for obtaining precise prostate locations just prior to the radiation treatments so that interfractional organ movements can be measured and corrected. After the computer performs an initial automatic fusion of the two data sets, the final precise organ shifts are found using a manual registration tool. Two methods were created to test the accuracy of the computer's automated fusion. The first method uses an initial planning CT from the old scanner and fuses it with 5 different daily treatment CT sets from the newer model for each patient. The automated fusion results were then compared to the final organ shifts obtained from the manual registration. The second method's process was repeated for the same patients, except the initial planning CT used was also taken from the newer scanner.
Results: On average, the first method differed from the final precise calculated organ shifts by 1.32 mm in the right/left direction, 4.47 mm in the superior/inferior direction, and 8.47 mm in the anterior/posterior direction. The average difference that the second method differed from the final calculated organ shifts was 0.40 mm in the right/left direction, 1.51 mm in the superior/inferior direction, and 2.67 mm in the anterior/posterior direction.
Conclusion: The second method's results were significantly closer to the true organ shifts in the anterior/posterior directions by an average of 5.80 mm. Therefore, the automated process was more accurate in determining organ movement when it used CT data sets exclusively from the newer CT scanner with higher quality images. These results are important because anterior/posterior movement is the most crucial aspect for prostate treatment, since the rectum is very radiosensitive and planning margins on the rectal side of the prostate are minimal.

1016 POSTER

Maximum standardized uptake value of FDG-PET in the primary tumor as a predictor of pericolic/-rectal infiltration in colorectal cancer

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Background: Pericolic/-rectal infiltration of the primary tumor is a important factor in the planning of therapeutic strategies in patients with colorectal carcinoma (CRC). But it is not easy to detect pericolic/-rectal infiltration by preoperative imaging studies because of small size of lesions.
Purpose: The aim of this study was to determine whether ^{18}F-FDG uptake of the primary tumor is a predictor of pericolic/-rectal infiltration in patients with CRC.
Methods: 137 patients with initial diagnosis of CRC were included this study. All patients underwent preoperative ^{18}F-FDG PET or PET/CT. The pericolic/-rectal infiltration confirmed by postoperative pathology data. Maximum standardized uptake value(maxSUV) was used to interpret ^{18}F-FDG uptake within the primary lesions and best cut-off of maxSUV was determined using ROC analysis. Multivariate analysis was performed with logistic multivariate regression to assess the joint effects and interactions of the variables [age (>60 vs <60), gender (M vs F), histologic grade (well/moderately vs poorly/undifferentiated), histology (adenocarcinoma vs non adenocarcinoma), and max SUV] on pericolic/-rectal infiltration.
Results: Pericolic/-rectal infiltration were found in 57% of patients The best cut-off value for pericolic/-rectal infiltration was maxSUV > 5.5 (AUC 81%). Multivariate analysis showed that maxSUV and histologic grade were independent predictosr for pericolic/-rectal infiltration (P < .001).
Conclusion: Patients with high maxSUV (>5.5) and high histologic grade in the primary lesion had significantly high risk of pericolic/-rectal infiltration. In patients with CRC, ^{18}F-FDG uptake by the primary tumor is a strong predictor of pericolic/-rectal infiltration.

1017 POSTER

4D-CT, 4D-MRI and Linac-integrated 4D Cone Beam CT of the Lung: reproducibility of tumour size and displacement in a respirated ex-vivo system

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Background: 4D imaging is a key to motion-adapted radiotherapy of lung tumors. A hypothetical workflow would use 4D-CT or 4D-MRI for radiotherapy planning and verification with 4D-imaging integrated into the linear accelerator. We evaluated in a respirated ex-vivo system, how size and displacement of artificial pulmonary nodules are reproduced with 4D-CT, 4D-MRI and linac-integrated cone beam CT (CBCT).
Materials and Methods: 4 porcine lung explants inside a chest phantom were prepared with 20 agarose nodules (mean diameters 1.3 to 1.9 cm, range 0.8−3.3 cm), respirated at 8/min. and subject to 4D-CT (collimation

24×1.2 mm, pitch 0.1, rotation 1s, slice 1.5 mm, increment 0.8 mm, temporal resolution 0.5 s), 1.5T MRI (coronal dynamic 3d-flash; TREAT with TR/TE 2.13/0.72 ms, voxel size 2.7×2.7×4.0 mm, t.-res. 1.4 s) and linac-integrated CBCT (720 projections, 3 min. rotation, t.-res. ~1 s). Static CT without respiration served as control. 3 observers recorded lesion size (RECIST x/y/z-diameters) and axial displacement using standard viewing software. Interobserver- and interphase-variation coefficients (VC for different respiratory phases) indicated the reproducibility of measurements.
Results: Mean lesion sizes on static and dynamic CT were equal (x: 1.88 vs. 1.87 cm; y: 1.30 vs. 1.39 cm; z: 1.71 vs. 1.73 cm; all $p > 0.05$), but appeared larger on MRI and CBCT (x: 2.06/1.95 cm [$p < 0.05$vs.CT]; y: 1.47/1.28 cm [MRI vs. CT/CBCT $p < 0.05$; CT vs.CBCT $p = 0.89$]; z: 1.86/1.83 cm[CT vs. CBCT $p < 0.05$, other $p > 0.05$]). The interobserver-VC for lesion sizes were 2.54−4.47% (static CT), 2.29−4.48% (4D-CT); 5.44−6.22% (MRI) and 4.86−6.97% (CBCT). Interphase-VC for lesion sizes were 2.28−3.54% (4D-CT), 6.56−8.36% (MRI) and 7.30−10.0% (CBCT). Mean axial displacement decreased from static CT (1.65 cm; VC = 2.77%) over 4D-CT (1.40 cm; VC = 2.9%) and CBCT (1.23 cm; VC = 5.9%) to MRI (1.16 cm; VC = 12.3%).
Conclusions: As a consequence of lower spatial and temporal resolution, 4D-MRI and CBCT slightly overestimate lesion size and underestimate displacement with a lower reproducibility of measurements compared to 4D-CT. All modalities are suitable to measure size and displacement of target lesions. Prior to a clinical application, the technical limitations were anticipated in this ex-vivo study.

1018 POSTER

Screening of malignant tumours – importance of fibrinogen serum levels by comparison with other biological parameters

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Background: The named Constitutional Syndrome (asthenia, anorexia, weight loss, fever, etc), with any fact to be localized, is frequently observed and to know its nature (infectious, inflammatory, tumoral etiology) is urgent. To have biological parameters of easy and fast evaluation, reliable and low cost is often profitable.
The aim of this study was to prove the utility of fibrinogen serum levels for screening of malignant tumors and to compare that with others biological parameters.
Patients and Methods: We have studied 472 tumoral patients. They were distributed in 10 subgroups according to localization. Age: 13−92 years old. Gender: 70% males. Extension: 62% of then with any metastasis. In all patients the following biological parameters were evaluated in serum: fibrinogen, platelets, haemoglobin, E.S.R., albumin, a2 globulin, a1 antitrypsin, acid and alkaline phosphatases, LDH, γ-GT, a-fetoprotein and CEA. The results were compared with healthy and pathological (no tumoral populations). Statistical analysis included probability, sensibility and specificity.
Results: Fibrinogen was elevated in 44% of tumoral patients, with statistical difference in comparison with healthy and no tumoral populations ($p < 0.001$ both subgroups); that increase was also significant in 9 of 10 tumoral subgroups. Sensivity of fibrinogen to detect malignant tumors was 68% and specificity 80%. Not other biological parameter clustered so much statistical facts in favour of malignant tumor.
Conclusions:
1. Fibrinogen is a biological parameter of easy, fast and economical measurement.
2. It is increased in a wide tumoral population, even in absence of metastasis.
3. Its utility to diagnosis is reinforced when it is associated to other altered biological parameters.

1019 POSTER

CT study on eye lens protection during whole-brain radiation by change of the line of sight

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Background: The seamless registration of the subfrontal region and protection of the eye lenses is a notorius problem in whole-brain radiation. Objective of this investigation is whether a change of the line of sight by looking up, down, or straight ahead leads to a greater distance between the subfrontal brain (cribirforme plate) and lenses. Therefore potentially an improved dose distribution of the subrontal region with uppermost protection of the eye lenses can be achieved.
Methods: 12 patients with an indication for whole-brain radiation were studied. During the planning CT scan (slice thickness 3 mm) they were instructed to look up, down and straight ahead. Three consecutive CT scans were performed. The distance between the eye lenses and cribrifome plate was measured for each CT scan.
Results: The distance between the lenses and the cribirforme plate was significantly increased by 6−9 mm when patients were looking down. Looking up (1−3 mm) and looking straight ahead (4−5 mm) were associated with an intermediate distance to the irradiated area.
Comclusion: Instructing the patient to look down results in a significantly improved distance between the lens and the cribriforme plate. With this simple method a better coverage of the brain can be achieved with protection of the eye lenses.

1020 POSTER

The diagnostic value of FDG-PET in soft tissue and Ewing's sarcoma

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Soft tissue sarcoma and Ewing's sarcoma comprise a group of relatively rare tumors in which the conventional diagnostic techniques often yield unspecific and doubtfull findings.
Purpose: The aim of this study was to compare the value of FDG-PET and CIM (conventional imaging modalities: CT, MRI) in patients with Ewing' s sarcoma and soft tissue sarcoma.
Patients and Methods: The consecutively addmitted patients with histologically proven Ewing's sarcoma (5 pts.) and soft tissue sarcoma (13 pts.) were examined by FDG-PET for postoperative residual desease, recurrency detection and therapeutic response assessment. The soft tissue sarcoma group consisted of 3 fibrosarcomas, 3 liposarcomas, 1 synovial sarcoma, 2 malignant Schwannomas, 1 pleomorphic liposarcoma and 3 leiomyosarcomas.
CIM and FDG-PET were performed within 2 month interval and the findings were compared. Histology and clinical/imaging follow-up served as gold standard.
Results: The tumors were mostly localised in thorax region (8/18) and retroperitoneum (7/18). The sensitivity, specificity, positive predictive value and negative predictive value for CIM were as follows: 55.56%, 33.33%, 45.45% and 42.86% and for FDG PET: 77.78%, 88.89%, 87.50% and 80.0%. CT findings were false positive in 4/7 pts. and false negative in 2 pts. in retroperitoneal localisation. In the same region there were no false positive or false negative FDG PET findings. In the thorax CT finding was false positive and false negative in 2/8 pts., respectively. For the same localisation FDG PET was false negative in 2/8 pts., without any false positive finding. The only one false positive FDG PET finding was located in the lower extremity.
Conclusion: Our series demonstrated better sensitivity and specificity of FDG PET in comparison with CIM in recurrency or residual desease detection, especially in the retroperitoneal soft tissue sarcoma.

1021 POSTER

Action Cancer: digital mammography with satellite transmission on a mobile unit

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Background: Action Cancer, a charitable organisation in Northern Ireland, provides free, high quality breast cancer screening services to women who fall outside eligibility for the National Health Service Breast Screening Program (NHSBSP), specifically those aged 40−49 years and >65 yrs. With reports that digital mammography better visualises dense breast tissue prevalent in younger women, without reduced image quality for older women, Action Cancer chose to utilise a digital mammography system. The purpose of this paper is to describe the unique system in place, which utilises satellite transmission for the mobile unit.
Material and Methods: Working closely with Siemens Medical Solutions and utilising the 'Mammomat Novation' system Action Cancer installed the digital screening technology in the main clinic and on their mobile services unit (The Big Bus). The Big Bus, a £1.5 million partnership project between the organisation and the private sector, is an 18 metre-long unit, housing screening, health check and therapeutic services, the only one of its kind in Europe.
Results: Since September 2006 Action Cancer successfully implemented the only digital screening system in Northern Ireland, both in their main clinic and on their Big Bus. Following Quality Assurance (QA) standards, at Action Cancer House (ACH) the image is taken on the SIEMENS Novation DR and is then sent to mammoreport station and archive. For the Big Bus, however, once the image is taken on the SIEMENS Novation DR, it is then sent to sienet sky system where prototype compression technology