less nodal stations involved on PET vs. CT (stations 10, 5, 7; 4R and 4L, respectively); in two patients, PET identified CT-negative mediastinal stations (station 5 and 7, respectively). PET based planning thus resulted in an increased nodal GTV in 2 patients (9.5%) and a decrease in 3 patients (14.3%). Taken all patients together, however, there were no significant differences in GTV, lung, and esophageal parameters between CT and PET-based plans. For CT vs. PET: V20 25.6±12.4 vs. 25.6±12.3% (p = 1.00); MLD: 13.7±5.6 vs. 13.7±5.6 Gy (p = 0.89); MED: 24.4±8.6 vs. 24.1±8.5 Gy (p = 0.50); Dmax: 45.8±2.9 vs. 45.7±2.9 Gy (p = 0.32). For the three patients in whom the nodal GTV decreased with PET, the V20 decreased from 25.5±4.9 to 22.0±7.1% (p = 0.10); MLD from 13.2±2.5 to 11.6±3.3 Gy (p = 0.10); MED from 25.0±8.5 to 21.0±5.7 Gy (p = 0.10); Dmax from 46.2±0.21 to 45.5±0.71 Gy (p = 0.32).
Conclusions: Incorporating 18FDG-PET information in radiotherapy planning in patients with LD-SCLC changed the treatment plan in 24% of patients compared to CT. Both increases and decreases of the GTV were observed, theoretically leading to the avoidance of respectively geographical miss or a decrease of radiation exposure of normal tissues. Based on these findings, a phase II trial, evaluating PET-scan based selective nodal irradiation is ongoing in our department.

920 POSTER

Profile of radiotherapy departments contributing to the EORTC Radiation Oncology Group (ROG) in the 21st century

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Purpose: Since 1982, the EORTC-ROG has pursued an extensive Quality Assurance (QA) program of all radiotherapy (RT) centers participating in clinical trials. The first step is the evaluation of the departments' human, technical and structural resources and their ability to provide high-tech RT.
Materials and Methods: A facility questionnaire (FQ) was initially developed in 1989 and circulated to 50 centers in the early 1990s. From an analysis of these data it was possible to introduce the proposition for a first set of minimum requirements for RT departments' infrastructure and resources. Since then, the FQ was updated and adapted to the latest evolutions of the RT techniques. We report here on the facilities available at 58 centers from 18 countries currently involved in clinical trials of the EORTC-ROG and who completed the updated FQ after December 2005.
Results: The centers' equipment and staffing vary widely. Comparisons with data collected previously are shown in the table. Currently, only 9 centers still use a Cobalt unit, all centers perform 3-D Conformal RT and 74% of them can perform IMRT. 88% of the centers have access to a MRI and can plan treatment using image co-registration. 69% can perform image co-registration using PET or PET-CT. All but one center (film) uses portal imaging to verify patient set up. External dosimetry audit was performed in 79% of the centers for electrons and in 90% for photons, but it was recent (<2 years) in only 52% and 55%, respectively.

	1990–1992[1] (50 Centers) Mean (range)	2006–2007 (58 Centers) Mean (range)
nb. Cancer Pts treated/year	1452 (300–3600)	1987 (470–6969)
nb. Cancer Pts/Equipment x year		
Simulator	1192 (300–2341)	991 (251–2700)
Treatment unit	506 (234–1033)	520 (69–1675)
nb. Cancer Pts/Staff x year		
Radiation Oncologist	316 (60–1243)	259 (108–480)
Radiation Physicist	464 (166–1052)	434 (177–827)
Radiation Technologist	131 (36–420)	141 (40–1350)
% Centers using CT for RT planning	72%	100%
% Pts with planning CT	20−25%	84.2% (range: 30–100)
% Centers with In vivo dosimetry	±30%	81%

[1]Bernier et al. IJROBP 1996

Conclusion: Between 1990 and 2006, the pre-treatment workload shifted from simulator to CT. The radiation technologist's workload increased, but their work might be facilitated by the use of MLC and computerized set-up. The newest RT techniques are already widely implemented in the clinic. External dosimetry audits should be performed more often. Repeated assessment using the FQ is warranted to document the evolution of the European RT centers.
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921 POSTER

Non-respiratory stomach motion in healthy volunteers

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Background and Purpose: Intrafraction organ motion refers to the change of organ position during radiation therapy (RT) delivery. In the chest and upper abdomen, it is dominated by respiratory displacement. Peristalsis, cardiac motility and variable filling of hollow organs are other physiologic sources of organ motion, but less is known about their influence on planning target volume (PTV). Currently, patients receiving RT for gastric carcinoma or lymphoma are treated 1 hour after a standard meal. The aim of the study is to characterize stomach displacement in the fasting state and during the hour after a standard meal.
Methods: Ten consenting healthy volunteers (8 female, 2 male) underwent 2D Fiesta cine MRI studies on 1.5T GE scanner in 30-second voluntary breath hold. At each time point, series were acquired in axial, coronal and two oblique planes. Fasting series (T0) were followed by a standard meal. Scanning was performed at T5, T15, T30, T45 and T60 minutes after the meal. For each series, conversion to a Pinnacle compatible format (ie. time coordinate converted into Z) using RMP Dicom Viewer [Graham Wilson] was followed by contouring of the stomach. Deformable perimetric analysis was conducted on Matlab v 7.1 [The MathWorks, Inc]. Each 2D contour was sampled with 200 evenly spaced points and matching points were found for all contours in the same 30-second acquisition. For each patient, the mean magnitude and standard deviation (SD) of displacement of each point was determined. Maximal, minimal and median values are provided to summarize the population, both in any direction and in 6 cardinal directions.
Results: Median displacement (pooled across time) in the right-left (RL), sup-inf (SI) and ant-post (AP) directions was 0.3; 0.8; and 0.3 mm, respectively. The extreme values for deviations in each direction were 4.4; 7.7; and 3.6 mm. The greatest extreme of motion was seen in the SI direction, but differences by direction were typically small. Median standard deviation (SD) is shown in the table for each direction and time point. No statistical difference in the range of the displacement or in variance was found when comparing between fasting and all postprandial phases using the Kruskal-Wallis test.
Conclusions: Non-respiratory intrafraction stomach displacement is small with extreme values usually in the range 4−8 mm for the SI direction and rarely exceeding 4 mm for RL and AP. The stability of stomach position does not differ between the fasting and postprandial states when a small, standard meal is taken. Radiotherapy may be delivered at any time within the first hour after eating without significant compromise of planned PTVs.

Median SD	RL	SI	AP
T0	2.6	2.7	2.8
T5	2.2	3.3	2.2
T15	2.9	3.5	2.9
T30	3.2	3.3	2.7
T45	3.1	3.6	2.7
T60	2.5	3.5	2.1
p-value	0.09	0.55	0.71

922 POSTER

Estimated dosimetric impact of IGRT in liver SBRT with breath-hold

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Background: Active breathing control (ABC) for liver immobilization and image guided radiation therapy (IGRT) can be used to improve setup accuracy for liver cancer stereotactic body radiation therapy (SBRT). A simple IGRT strategy, using orthogonal imaging with the diaphragm as a surrogate for liver often places the liver within 5 mm of its planned position.
Purpose/Objective: Estimate dosimetric impact of IGRT in patients undergoing liver cancer SBRT with ABC.
Materials and Methods: 21 patients treated in exhale breath-hold on a 6-fraction SBRT liver protocol were evaluated. All had daily image guidance with orthogonal images and repositioning for offsets >3 mm. The diaphragm was used for cranial-caudal (CC) alignment and vertebral bodies for anterior-posterior (AP) and left-right (LR) alignments. Offsets