subjects (Mann Whitney U, p<0,05), no change was determined after irradiation. Comparing to control levels, no significant difference was found in GSH levels of cancer patients. They were observed to be decreased by abdominal irradiation (Wilcoxon signed rank test, p<0,05). All the plasma levels were found to be unaltered by head &neck irradiation. There were no significant correlations between the plasma levels of the parameters and sex. A correlation was observed between the plasma MDA levels and age (Pearson 0.578, p<0,05).

Conclusion: Except for the well-known radiation-induced damage, radiation effect is characterized by different biochemical derailments on different anatomic localizations and RT techniques. The alterations of the parameters indicate enhanced oxidant stress and different antioxidant requirements after RT. This observation provides further evidence for the need of detailed biochemical monitoring during irradiation.

527 POSTER

Movement of calcified mediastinal lymph nodes with breathing

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Introduction: Lung tumour motion with breathing can result in inadequate coverage of disease by radiation treatment portals. To compensate for movement large safety margins are added around the CTV. However this strategy increases the risk of normal tissue toxicity and limits the scope for dose escalation. Previous studies have reported significant displacements of primary intrathoracic tumours with breathing (>10mm). However the movement of mediastinal lymph nodes has not been defined. We noted that occasional patients referred for thoracic irradiation had calcified mediastinal lymph nodes (LN) identifiable on fluoroscopy. We propose that these 'visible' LN represent practical surrogate by which to estimate the general breathing motion of LN involved with tumour.

Methods: Patients with primary lung tumours were selected for this study on the basis of the presence of calcified LN visible on fluoroscopy. 24 calcified LN were identified in 15 patients (14 NSCLC, 1 SCLC). Spirometric testing showed that 8 had restrictive defects compatible with chronic obstructive pulmonary disease and emphysema. Nodes in the following ATS stations were identified: 2R(1), 4R(7), 7(2), 8(1), 10R(3), 11R(8), 11L(2). LN mobility during quiet breathing was monitored by fluoroscopic screening performed with arms abducted. Images were recorded at the extremes of respiratory excursion using gantry angles of 0 and 90.

Results: The mean movement (mm) of LN in the cranio-caudal (c.c.) direction was 5.1 (C.I. 3.6-6.7). In the dorso-ventral (d.v.) and medio-lateral (m.l.) directions the observed displacements were 2.1 (C.I. 1.1-3.2) and 1.6 (C.I. 0.8-2.4) respectively. There was a correlation between movement in the c.c. and d.v. or m.l. direction (r = 0.55 and 0.55; p≈ 0.005 and 0.011 respectively). There were no significant differences seen between the movement (expressed as a cartesian vector) of mediastinal (5.5) vs intrapulmonary (6.4) nodes or supra (6.6) vs infra (5.7) carinal nodes. There was no correlation between spirometric parameters or tumour size/stage and movement.

Conclusions: We have demonstrated that the movement of calcified LN during breathing can monitored by fluoroscopy in a cohort of patients with lung tumours. The displacements of these LN during quiet breathing is anisotropic and smaller than that previously reported for primary lung tumours. These data should be incorporated into the expansion algorithms used to define the PTV.

528 POSTER

The choice of optimal radiotherapy technique for locally advanced maxillary carcinoma using 3D treatment planning system

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Purpose: To compare the isodose distribution of three radiotherapy techniques for locally advanced maxillary synus carcinoma and analyze the potential of 3D conformal radiotherapy planning to achieve adequate target dose delivery and sparing of uninvolved healthy tissue structures. **Patients and Methods:** CT scans of forteen patients with T3-T4,N0,M0 maxillary synus carcinoma were acquired and transferred to treatment planning system. A conventional 2D treatment plans with classicaly shaped one anterior + two lateral opposite fields and two types of 3D conformal radiotherapy plans were compared for each patient (*3D-S plan:* MLC shaped one anterior + two lateral opposite fields; *3D-NS plan:* MLC shaped three noncoplanar fields). The target volume and uninvolved dose limiting structures were contured on axial CT slices throughout the volume of interest. The planning parameters for these volumes and degree of neurooptic structures and parotid glands protection were evaluated for all three techniques. A comparison of plans and treatment techniques was assesed using isodose distribution, dose statistic and dose volume histograms.

Results: The best conformity of dose delivered to target volume was achieved with 3D-NS technique and significant differences were found comparing 3D-NS vs. 2D (D*max*: p<0,05; D*aver*: p<0,01; D*min*: p<0,05; V90: p<0,05 and V95: p<0,01) and 3D-NS vs. 3D-S technique (D*min*: p<0,05; V90: p<0,05 and V95: p<0,01) while there were no differences for 2D vs. 3D-S technique.The 3D-S conformal plans were significantly superior to the 2D plans regarding the protection of parotid glands and additional improvement of dose conformity was achieved with 3D-NS technique. 3D-NS technique resulted in decrease of D*max* for ipsilateral retina comparing with 3D-S technique, while (because of beams direction) the level of D*max* for optic nerve was increased (but in acceptable range) with 3D-NS technique.

Conclusion: 3D planning of radiotherapy for localy advanced maxillary synus carcinoma with noncoplanar fields whose number don't exceed the number of fields for conventional arrangement enables the conformal delivering of adequate dose to target volume with improved sparing of contigious uninvolved healthy tissue structures.

529 POSTER

Differential radioenhancing properties of oxaliplatin and cisplatin in human cervical and lung cancer cell lines

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Objective: Combined modality treatment, including radiotherapy and cisplatin, is now frequently and sucessfully used in the treatment of cervical and lung cancer. Cisplatin has become a standard part of many treatment regimes, but it is not clear whether it is possible to achieve even better efficacy with some other drugs or drug combinations. We tested the combined effects of oxaliplatin and radiation versus cisplatin and radiation using human cervical- and lung cancer cell lines.

Material and Methods: CaSki cervical cancer cells, and A549 lung cancer cells were cultured under standard conditions. Cells were treated with escalating doses of gamma-irradiation (0 - 6 Gy), different doses of oxali- and cisplatin (1 to 20 microM) for 2 hours or 24 hours, or a combination of both. Cell survival was measured by a standard colony-forming assay, after 10 days of growth colonies containing more than 50 cells were scored as survivors. Survival curves, each referring to its specific control were fitted to the data using the linear quadratic model. Sensitizer enhancement ratios (SERs) were calculated at the 37% survival level, and isobologram analysis was applied to test for the drug-radiation interactions.

Results: Oxaliplatin as well as cisplatin alone were cytotoxic in a time and concentration dependent manner, where CaSki cells were more sensitive to drug treatment than A549 cells. After a 2-hour treatment cisplatin was slightly more toxic than oxaliplatin, after a 24-hour treatment both drugs showed the same toxicity. In CaSki cells, oxaliplatin and cisplatin significantly increased radiation toxicity with SERs up to 2.25 for 2.5 mM oxaliplatin given for 24 hours. In A549 cells no increase of radiation toxicity was observed after treatment with cisplatin, however oxaliplatin induced a significant radiosensitization with a SER of 2.30 when 2.5 mM oxaliplatin were given for 24 hours. Isobologram analysis revealed supraadditive interaction between oxaliplatin and radiation in A549 lung cancer cells.

Conclusion: Oxaliplatin had the same effectiveness on tumor cells as cisplatin and induced enhanced radiation toxicity in lung cancer cells, where cisplatin was not effective. This higher potential in combined modality treatment is rendering oxaliplatin to be a promising compound for the modification of radiation response in tumor therapy.

530 POSTER

Evaluation of quality assurance procedure in brain tumors radiotherapy in children

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Purpose: Radiation therapy is effective in brain tumors in children in conjunction with surgery and chemotherapy. Precision volume irradiation