Only 1 patient showed a transient grade 3 toxicity (pneumonitis), and there where no grade 4 acute/subacute side-effects. Two patients with stage III A central tumors in close proximity to the large vessels died due to a pulmonary hemorrhage 2 and 4 months after therapy, respectively. No patient developed esophagitis. Antimycotic prophylaxis for esophagitis and posttherapeutic steroid prophylaxis for pneumonitis (by turbohaler) for several weeks are used routinely.

Conclusions: This method allows to reduce radiation doses to normal tissues significantly and enables dose escalation in radiotherapy of lung cancer.

332 POSTER

A simple technique for the optimization of the dose distribution in the lower neck and upper thoracic area

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Propose: Caused by the changing anatomy and tumor localisation, it is not easy to reach a conformal dose distribution in the lower neck and upper thoracic area. A simple technique with three blocked fields makes it possible to fit the dose to the planing target volumes.

Materials and Methods: For tumors of the cervical esophagus and the trachea three to four CT-scans are required. The planing target volumes in these planes are drawn and superimposed at the central plane. Computer planing is done for a three-field technique with one ventral and two ventral-oblique fields. Special blocking and collimator rotation gives a conformal dose distribution in all planes with different contours. With the proper choice of the central plane a optimal dose is reached in all planes.

Results: With this three-field technique it is possible to reach excellent dose distributions in tumors of the lower neck and upper thoracic region inspite of the big difference of body contours.

333 POSTER

Subcutaneous amifostin during fractionated radiotherapy: A randomized phase II study in pelvic tumours

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Purpose: In the present study we investigated the radio-protective efficacy of a schedule of amifostin delivered subcutaneously.

Methods: A total of 40 patients undergoing radiotherapy for locally advanced pelvic cancer (bladder 14 pts, gynecological 12 pts, rectal 11 pts, sarcomas 3 pt) were enrolled in a randomized phase II trial. 20 patients received amifostin 500 mg rejected sc. 15–20 min before each fraction of conventionally fractionated radiotherapy. Amifostin was diluted in 5 ml of NS and rejected in 2 different sites. The toxicity was recorded daily following the WHO scale.

Results: Local rejection of the drug caused mild pain and bruises while grade 1 erythema was noted in 2/20 (9%) patients. Mild nausea was the main side-effect. Severe vomiting and asthenia that enforced amifostin interruption (after 4–15 rejections) was observed in 3/20 (9%) patients. One allergic episode with fever and generalised rush was observed. The incidence of intestinal radiation toxicity and the delays of radiotherapy were significantly reduced in the group of patients receiving amifostin ($p = 0.04$). Cystitis never occurred in the amifostin group. A substantial protection of the pelvic skin and perineal area was also observed.

Conclusions: Subcutaneous administration of Amifostin during fractionated radiotherapy is feasible and well tolerated. The profile of tolerance seem to be better that the iv. administration. The efficacy of the regimen in terms of radioprotection of pelvic tissues is confirmed.

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Total body irradiation (TBI) before bone marrow transplantation (BMT): Technique and acute toxicity

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Purpose: to evaluate the TBI methods in the National Institute of Oncology between January 1984. and February 1998.

Patients and Methods: 124 patients underwent TBI prior to BMT in the last fifteen years. A special cobalt unit has been used, the dose rate was 6–8 cGy/min. The source-midline distance (SMD) was 340 cm and the field size was 80 × 200 cm. The dose calculation was done on the basis of Tissue-Phantom Patio curve measured in TBI conditions and effective tissue thickness (ETT). Between 1984 and 1992 the beam direction was horizontal, the patients lay in lateral position. In 11 cases the total dose to the abdominal midline was 10 Gy, in one fraction. Form 1986 the fractionation changed to 4 × 3 Gy in 4 days. With individual lung shielding the average lung dose was 8,5 Gy. In 44/124 cases the order of conditional treatment was chemoradiotherapy. Since 1992 vertical beams were used, and the patients (80/124) laid in prone/supine position. The fractionation remained the same but radio-chemotherapy regime has been used.

Results: The irradiation in prone position proved to be safer than lateral because of smaller patient motion and it resulted in a more accurate positioning of lung shielding too. In all cases, the acute side effects (headache, nausea, vomiting) were moderate. Using radio-chemotherapy the acute side effects during the TBI were uncommon, and well tolerable.

Conclusion: Our technique with the large SMD, vertical beam direction and the supine/pronc position is stable, convenient and safe to produce homogenous dose distribution and ensures accurate and reproducible lung shielding.

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External beam radiotherapy of intraocular metastases

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Purpose: We tried to assess if the use of lens-sparing irradiation is justifiable in patients with intraocular metastatic disease. As the results of primary cancer therapy are improving and life expectancies are increasing, the incidence of late distant metastatic tumors is growing. Several patients develop metastatic tumors at previously unexpected sites such as choroidal metastasis with serous retinal detachment, accompanied by visual impairment. This can cause a significant worsening of quality of life.

Methods: From February 1994 to September 1998 the radiotherapy of 14 patients with intraocular metastases was performed at our department. Breast, lung and bladder were the primary tumor sites. Diagnosis and follow-up was based on ophthalmologic, ultrasonography, CT and/or MR examination. Rectangular wedged-pair or moving field therapy was applied first, then we switched to a modified lens-sparing method, of Schipper's technique.

Results: 3 patients are alive after 5 months with excellent visual acuity, useful vision was preserved in the other 11 patients, for a mean survival time of 6 months. No radiation cataract was observed during the follow-up period (1 to 29 months, mean: 6 months.)

Conclusion: The use of lens-sparing radiotherapy techniques results in improved or maintained visual acuity and so the quality of life of selected patients with intraocular metastases can be significantly improved.

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Procedures of radiotherapy with boron neutron capture reaction at the Petten irradiation facility

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Purpose: to establish standard procedures for a complex radiation modality according to the accepted rules of radiotherapy assuring the safety, good reproducibility and high quality of the performance.

Method: The different steps of the preparation for the treatment planning, procedures of the planning using the RTPE/RTT_MC treatment planning system, patient positioning, blood boron content monitoring, irradiation at HFR, reporting on BNCT the quality control and documentation of these procedures have been established for the first European clinical trial.

Achievements: The agreement on the special definitions for patient radiotherapy with BNCT, the detailed description of the preparation and treatment performance procedures proved their applicability during the BNCT of the first patient cohort. The boron neutron capture absorbed dose DB is defined for the group of patients in a physically defined point, where the thermal fluence is a maximum for a given treatment plan. The doses in the organs at risk, dose distribution in the volume of interest together with the dose-volume histograms for the target and the healthy brain are calculated. The positioning to the fixed horizontal beam under special conditions was solved. The blood boron concentration is measured by prompt gamma ray