

dose distribution, dose statistics, and dose volume histogram (DVH) of PTVs were used to evaluate differences between respiratory gated conventional 2-D plans and respiratory non gated 3-D conformal treatment plans. In addition, the risk of radiation exposure of surrounding normal liver and organs are evaluated by means of DVH and normal tissue complication probabilities (NTCPs).

Results: The vertical movement of liver ranged 2–3 cm in all patients. We found no difference between respiratory gated 2-D plans and 3-D conformal treatment plans with the patients breathing freely. Treatment planning using DVH analysis of PTV and the normal liver was used for all patients. DVH and calculated NTCP showed no difference in respiratory gated 2-D plans and respiratory non gated 3-D conformal treatment plans.

Conclusion: Respiratory gated radiation therapy was very important in hepatic tumors because radiation induced hepatitis was dependent on remaining normal liver volume. Further investigational studies for respiratory gated radiation treatment combined with 3-D conformal treatment are required.

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PUBLICATION

Measurement of patient entry and exit doses during total body irradiation

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Purpose: There is no standard algorithm to calculate the dose distribution for TBI under translation conditions with commercial treatment planning systems. Therefore it is necessary to observe the applied dose which has to be calculated by hand for several points with in vivo measurements.

Methods: The doses at relevant points of the body are calculated using the beam-zone method and data from systematical phantom measurements. To verify these calculations we use a set of at least 6 up to 12 semiconductor probes which are attached to the patients skin to measure the entrance and exit doses. The dose at body-center can be calculated from these values. The results are corrected for varying patient geometries.

Results: Dose measurements for actual 35 patients show a correspondence between calculated and applied doses in the range of $\pm 10\%$ for the center of the lung and in the range of $\pm 5\%$ for a reference point in the middle of the body.

Conclusion: In the clinical routine the use of semiconductor probes provides an easy and fast way to measure point doses during TBI. This method allows an online verification of calculated doses.

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Intraoperative high dose rate interstitial irradiation of hepatic metastases

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Resection of hepatic metastases offers long-term survival (25–30% 5-year), and possibly cure for selected patients. Thirty per cent of patients undergoing laparotomy for possible resection have unresectable metastatic disease confined only to the liver. Irradiation might provide benefit in median survival if a tumoricidal dose could be administered to the hepatic metastases.

Eligibility criteria included only liver disease with the primary tumor controlled and no extrahepatic involvement, no cirrhotic liver, acceptable surgical risk, patient life expectancy greater than 3 months and a total volume of potentially unirradiated liver of 30–40% (defined by 3D reconstruction with MRI). All the patients must have been treated at least with a first line of chemotherapy. From July 1998 to February 1999, 7 procedures have been done in our Unit. Patients underwent laparotomy in the operative suite of the Radiotherapy Unit, adjacent to the radiotherapy bunker where the afterloaded high intensity (10 Ci) iridium 192 source is kept. Careful abdominal exploration define both, resectability or implant of hepatic metastases. Liver was mobilized by dissection of the falciform ligament. Patients with resectable lesions underwent lobectomy or wedge resection. Unresectable disease and the scar of resectable metastases are encompassed within a volume implant or implants. Intraoperative ultrasound is employed to confirm diagnosis and for guiding the insertion of the implant covering the area wanted to be irradiated. The dosimetry is done in real time with optimization of the dose to the required volume. After irradiation, the patient is carried back to the operating room, the needles are removed, hemostasis is achieved and abdominal closure is completed. There are not acute or

chronic complication referable to irradiation. Hospitalizations were from 8 to 15 days (median 10 days). We will present this early experience and the technical aspects of the intraoperative radiation therapy technique

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The impact a multileaf collimator (MLC) may have on a departments confidence and quality assurance

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Purpose: To investigate the effect of introducing an MLC into a radiotherapy department. Is confidence affected by the possible 80 variables involved in making a conformal field, compared to none with customised blocks. Can confidence be restored?

Methods: A strict efficient method of Quality Assurance (QA) was employed involving all types and levels of operational staff. Strict protocols and test tools that graphically represented the correct function of the device were used. Methods for physically setting up the MLC during a service or repair that minimised downtime and Physics acceptance were employed.

Results: The MLC specification once proved during acceptance was the base for designing QA tools. Experience using the MLC quickly showed where time was lost and which items or problems most frequently occurred.

Conclusions: The final regimes allow a speedy daily QA and if a problem is detected, is followed by various levels of protocols, and tools, all of which may be carried out efficiently by any trained member of staff. An MLC expert is not required.

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Concurrent radiotherapy and chemotherapy with topotecan and stealth liposomal doxorubicin for the treatment of locally advanced pelvic tumours

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Purpose: Topoisomerases may have an important role in the repair of DNA damages induced by radiotherapy. The feasibility of radiotherapy combination with a topo-I inhibitor (topotecan, Hycamtin[®]) and a topo-II inhibitor (stealth liposomal formulation of doxorubicin, Caelyx[®]) was assessed in a pilot study.

Methods: Twelve patients (pts) with locally advanced pelvic tumours were recruited (3 sarcomas, 4 bladder carcinomas, 2 adenocarcinomas of unknown origin and 3 pelvic masses metastatic from cholangiocarcinoma or pancreatic carcinoma). Caelyx was given once every 2 weeks (d1) at a dose of 20 mg/m² and, Hycamtin was given 3 times every 2 weeks (d4, 8, 11) at a dose of 1 mg/m². Four cycles were given during the course of radiotherapy (64–70 Gy). The regimen was supported with G-CSF 480 µg sc. every Saturday and Sunday. Six received prophylactic use of HuEPO (20,000IU every Saturday and Sunday) and 6 did not.

Results: Complete symptomatic relief was obtained in all pts. Complete response was noted in 6/12 (50%) cases. No severe "in-field" radiation toxicity was observed. None of the pts developed neutropenia. Hemoglobin (Hb) levels were substantially reduced in 6 patients that did not receive HuEPO (mean Hb decrease 1.8 g/dL), while no Hb reduction was noted in pts supported with HuEPO.

Conclusion: Combination of radiotherapy with topotecan and stealth liposomal doxorubicin is feasible, well tolerated and a promising approach for locally advanced inoperable pelvic tumours.

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PUBLICATION

Subcutaneous administration of Amifostine in patients treated with radiotherapy. A preliminary report

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Purpose: To demonstrate the efficacy of Amifostine (AF) in patients treated with External Beam Radiotherapy (EBRT) plus chemotherapy.

Material and Methods: From January to August 1998 we enrolled in our study 6 patients affected by non small cell lung cancer (NSCLC) at stage IIIB; 6 patients affected by oropharyngeal cancer; 4 affected by cervix cancer. EBRT was delivered with a 6–23 MV linear accelerator. In all patient treatment doses were >50 Gy. AF was delivered subcutaneously 10 minutes before EBRT with the dosage of 500 mg.