for Conventional, 7.5 hours for Conformal therapy, and 9 hours for IMRT, with 3 hours, 5 hours and 14 hours for planning time respectively.
Conclusion: Conformal therapy and IMRT are significantly superior to conventional technique to allow for normal tissues sparing. IMRT achieves better dose conformation but with higher integral dose than conformal therapy; the later is, however, best to achieve skin sparing. Finally, the overall workload is higher with IMRT than conformal therapy.

1404 POSTER

Performance reproducibility of intra-operative radiotherapy equipment – photon radiosurgery system

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Background: Intraoperative Radiotherapy (IORT) can deliver a critical dose to the tumour bed. It is being investigated whether a single high dose of radiation will impart the same clinical benefit as a standard course of external beam therapy. Our centre has four Photon Radiosurgery Systems (PRS) currently used to treat breast and neurological sites. The PRS comprises an x-ray generator, control console, QA tools and a mobile gantry. We investigated the dosimetric characteristics of each source and its performance stability over a period of time.
Methods: We investigated half value layer, output decay factor, internal rate monitor (IRM) reproducibility and depth-doses in water. The half value layer was determined by the broad beam method, using high purity aluminium attenuators. To quantify beam hardening at clinical depths, solid water attenuators of 5 and 10 mm were placed between the x-ray probe and attenuators. The ion chamber current was monitored over 30 minutes to deduce an output decay factor. IRM reproducibility was investigated under various exposures. Depth-dose curves in water were obtained at distances up to 35 mm from the probe.
Results: The mean energies for the beam attenuated by 5 and 10 mm of solid water were derived from ICRU Report 17 and found to be 12 and 24 keV. The average output level over a period of 30 minutes was found to be 98.9%. The average difference between the preset IRM limit and the total IRM count was less than 0.5%. For breast IORT, the average difference between the calculated and actual treatment times was found to be 0.30% (0.47% for neurological IORT). The beam attenuation in water varied by approximately $1/r^3$.
Conclusions: The x-ray sources are stable over time. Most measurements were found to lie within the manufacturer's tolerances and an intercomparison of these checks suggests that the four x-ray sources have similar performance characteristics.

1405 POSTER

Radiotherapy of the skin carcinoma of the inner cantus of the eye

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As 80% of all skin carcinomas develop on the face, the functional and aesthetic sequelae of the treatment are of paramount importance for the patient. Inner canthus of the eye is an anatomically complex region, offering slim chances for a radical excision of tumour with no undesired functional or aesthetic sequelae. Among several treatment options, surgery and radiotherapy are considered as treatment of choice. The main treatment aim is optimal cure with least possible functional and aesthetic damage. The cure rates after radiotherapy and surgery are similar, except that functional and aesthetic sequelae of radiotherapy are less mutilating.
From 1991 to 2004, we treated 61 pts (29 females, 33 males) with non-melanoma skin cancer of the inner cantus of the eye. Biopsy showed that 53 were basal-cell carcinomas, 5 squamous cell and 3 basosquamous cell carcinomas. Mean age of pts was 72, range from 43 to 88 years. All pts were trated by irradiation; 6 of them were primary treated by surgery (two of them 3 times each) and one by electrocoagulation. The follow-up ranged from at least one year to more than 10 years.
From 55 patients treated by irradiation as first treatment there was only one reccurence. In that patient tumor reccured 5 years after irradiatin and was salvaged by operation. Of 6 pts who had surgery as first treatment in 4 pts reccurence was cured by irradiation. Of remaining two, one was cured by second course of postoperative irradiation. Last patient was treated by operation 3 times, then by irradiation and was eventually salvaged by extensive operation with the removal of the eye.
In my opinion radiotherapy is the treatment of choice for skin carcinoma of the inner canthus of the eye, which is evident from the patients photograps taken before and after the treatment

1406 POSTER

Low acute and late toxicity with preoperative intensity modulated radiotherapy (IMRT) for rectal cancer

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Purpose: to report the acute and late side effects in a group of patients with rectal cancer treated with pre-operative intensity modulated radiotherapy (IMRT)
Methods and materials: Forty three patients with rectal cancer with an amount of small or large bowel inside the small pelvis were treated with preoperative IMRT. Twenty six patients had a primary locally advanced rectum cancer and 17 a local recurrence. To the pelvis, a total dose of 50 Gy (2 Gy/fraction) was given to 14 patients and 44.65 Gy (2.35 Gy/fraction) to 29 patients. Five patients received a boost of 10–20 Gy because they were inoperable.
Inverse planning was performed using the module Helios of the treatment planning system Cadplan. The constraints were set to encompass the PTV within the 95% isodose line while delivering at least 100% to the isocenter. An overdose of maximum 15% was allowed. The dose to small bowel, colon and bladder was minimized. Each IMRT plan with 5 non-equispaced beams was compared with a conventional 3-field plan in order to evaluate the dose reductions of the organs at risk. The acute toxicity was scored for all patients. Twenty six patients had a follow up >6 months (median: 14; range: 6 – 32 months). Late toxicity was scored in this group.
Results: A median volume of 71 cm^3 (3–239 cm^3) and 11 cm^3 (0–99 cm^3) small bowel were irradiated to the 90% and 100% isodose line, resp. Conventional planning would have increased the median small bowel volumes to respectively 155 and 95 cm^3. For large bowel, the volume irradiated to the 90% and 100% with IMRT was 24 cm^3(0–178 cm^3) and 8 cm^3 (0–55 cm^3). The median bowel volume (small + large) to the 90% isodose line was 214 cm^3 (24–513 cm^3), IMRT reduced it to 119 cm^3 (15–283 cm^3). Overall, no acute grade 3 or 4 toxicity was reported. Twenty eight percent of the patients had a RTOG grade 1 diarrhea and 16% a grade 2. Acute side effects related to the bladder and skin were also low. Only 3 patients had late toxicity: 1 patient had RTOG grade 1 bowel toxicity, and 2 patients had RTOG grade 2 bladder toxicity.
Three of the 33 (9%) operated patients had a pathological complete response. Pathological downstaging was found in 19 of the 33 patients (57%).
Conclusion: With a median and maximum volume of 71 and 239 cm^3 small bowel to the 90% isodose line, no grade 3–4 acute and late toxicity was reported. IMRT resulted in a significant reduction of the irradiated volume of bowel and bladder. Good pathological downstaging was also found.

1407 POSTER

Radiotherapy for bone metastases from Hepatocellular Carcinoma: dose-response relationship between the regression of extra and intra osseous masses.

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Purpose: The aim of this study was to evaluate retrospectively the palliative effect of radiotherapy (RT) for painful bone metastases and the dose-response relationship between the regression of extra soft-tissue and intra destructive osseous masses from Hepatocellular carcinoma (HCC).
Methods and Material: From January 2001 to June 2004, 26 patients (38 sites) with painful bone metastasis from HCC were analyzed. The patients received 8 Gy/1fr (single fraction group) in 10 sites, 20 Gy/5Ffr–30Gy/10fr (Moderate dose group) in 16 sites or 40 Gy /20f – 50 Gy/25fr (High dose group) in 12 sites. Irradiated sites were cervical spine (5), thoracic spine (6), lumbo-sacral (10), pelvis(8), long bones(5), others (4) respectively. The volume of extra-osseous soft tissue and intra-osseous masses respectively were measured both before and after radiotherapy periodically on the CT scan. Percent regression = ((pre-RT tumor volume – post-RT tumor volume) / pre-RT tumor volume)*100. Pain control was measured with self assessment questionnaire. Criteria for subjective response were as follows: CR was defined as complete disappearance of pain; PR was defined as 50% improvement in pain. NC meant that pain relief was minimal($\leqslant$50%) or absent. All patients were planning with 3D-RT planning system and were treated with 6MV-X or 10MV-X linear accelerator.
Result: Eighty one percent (31/38) showed some type of pain relief (CR_{PR). There were no significant differences in pain relief among the groups (Single fraction 80%, Moderate dose 82% and High dose 83%). The median duration of pain relief was 3.5 months, 5 months and 6months for Single fraction, Moderate and High dose group. High dose group had longer duration of pain relief than single fraction. ($p < 0.05$) In the median