one for epidermoid carcinoma in 1991, the other for metastatic disease in January 1995 (in 1988 she had had controlateral breast cancer: T1 N1 as the second cancer). No correlation was found between late effects and electron energy or number of fractions. *In conclusion:* there is no correlation between early and late radiation effects, consequential late effects can give radiation therapists a hint of doses higher than prescribed; a periodic programmed linear accelerator control of energies and doses is mandatory.

157 POSTER

NEUTRONS THERAPY FOR INOPERABLE OR RECURRENT PELVIC CHORDOMAS (RESULTS ON 13 PATIENTS)

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Between 1981 and 1994, 13 patients were referred to the Neutron Therapy Department for inoperable or recurrent pelvic chordoma.

Patient recruitment: Among the 13 patients, 3 were females and 10 were males; their mean age was 62 years. Two patients presented with a primary tumour and 11 with a recurrence. Three were referred for palliative treatment after previous surgery and radiation therapy (50 Gy or more). For one of the patients, the neutron treatment was interrupted after 3 fractions of 2 Gy.

Among the 12 patients suitable for evaluation, 10 had previous surgery. They underwent 1 to 5 (men 1.9) surgical operations. The delay between initial diagnosis and neutron therapy was 46 months (median) and 45 months (average), and the delay between the last surgical operation and neutron therapy was 13 months (median).

Treatment technique: Neutrons were used alone or as boost depending on the tumour volume or treatment purpose:

- 7 patients with large tumours (mean diameter: 16.8 cm) received a photon dose of 40 Gy followed by a neutron boost of 10 to 25 Gy (photon equivalent);
- 5 patients with smaller tumours (mean diameter 8 cm) were treated with neutrons alone; 2 were given 10 Gy in 12 fractions over 21 days with a palliative intention; 3 were given 17.6 Gy in 12 fractions over 28 days with a curative intention.

Results: At three years, the crude survival according to Kaplan-Meier is 61%. The local control probability is 54%. Two patients presented metastatic evolution, but one was cured by surgery. At the time of the evaluation, none of the patients treated with neutrons has grade 3 complications.

Conclusions: Although this series is rather small, it suggests that fast neutron therapy can provide a good alternative for the treatment of inoperable sacral chordomas.

158 POSTER

ONDANSETRON ANTIEMETIC PROPHYLAXIS IN PATIENTS UNDERGOING FRACTIONATED RADIOTHERAPY

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Patients (n = 109) given fractionated radiotherapy of the abdomen were studied to compare the antiemetic efficacy of ondansetron (ond) with placebo. The patients recorded daily emesis, nausea and bowel habit and graded weekly symptoms of nausea, vomiting, diarrhea and lack of appetite. The EORTC C30 questionnaire was completed. Sixty-seven percent of patients given ond had complete control of emesis compared with 45% of patients with placebo ($P < 0.05$). (Mean 18 fractions evaluated). Emetic episodes on the worst day was 1.4 for the ond group and 3.2 for the placebo group ($P < 0.01$). Patients given ond had fever days with emesis and nausea compared with placebo ($P < 0.05$). The mean sum score of patients' weekly grading of symptoms showed that the ond group had less inconvenience than the placebo group ($P < 0.05$). This difference persisted during the first 3 weeks, but not thereafter. Similarly some quality of life measures showed significant differences in favour of the ond group. More patients (n = 13) withdrew due to lack of efficacy in the placebo group (mean 4 fractions) compared with patients (n = 8) in the ond group (mean 10 fractions). We conclude to show marked beneficial prophylactic effect.

159 POSTER

LUNG FUNCTION IMPAIRMENT SECONDARY TO LOCOREGIONAL RADIOTHERAPY IN BREAST CANCER

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Radiation effects underlying lung tissue in radiation fields and causes damage. In this study, the secondary damage after radiotherapy in breast carcinoma is evaluated prospectively. In 20 patients with locally advanced breast cancer and received intensive chemotherapy, the pulmonary functions are evaluated by forced expiratory volume at 1 s (FEV1), relaxed vital capacity (VC), force vital capacity (FVC), FEV1/FVC, FEF (25–75) and regional ventilation and perfusion scintigrams are obtained, before and after radiotherapy. Patients followed-up in three month intervals (median 9 months). The reducement in FEV1 and VC was statistically significant ($P < 0.05$) but in FVC, FEV1/FVC and FEF (25–27) we have not found any statistically significant difference by comparing the values measured before and after treatment. Upper, middle and lower zones of treated and untreated lung zones compared after treatment and there was not any statistically significant difference for these values when compared by the before treatment values. As a conclusion we can say that the pulmonary function is affected by radiotherapy but this is not unacceptable. The changes in FEV1 and VC are confirmed restrictive lung disease.

160a POSTER

INTERSTITIAL PNEUMONITIS INCIDENCE DURING A FRACTIONATED TOTAL BODY IRRADIATION: RESULTS OF AN ORIGINAL DIGITIZED IMAGE PROCESSING

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Interstitial pneumonitis (IP) is a major toxicity problem after Total Body Irradiation (TBI). The aim of this retrospective study was to evaluate the irradiated lung volumes (ILV) despite shielded blocks to try to correlate the effective ILV with IP incidence. From 1984 to 1994, 146 patients with acute leukemia (AML or ALL) or chronic myeloid leukemia, received TBI prior to Bone Marrow Transplantation (120 Allo, 26 Auto). The IP incidence was 27% in Allo group and 6% in the Auto group. Two groups were comprised: "IP" group (n = 35) versus "non-IP" group (n = 111). The median follow-up was 32 months. It was given a fractionated TBI (12 Gy/3 fractions/3 days) with customized shielded lung blocks in order to reduce the pulmonary dose to 8 Gy. To calculate the ILV, we used an original digitized image processing with 3D mathematical model applied from the portal films. For every patient, each daily portal film was digitized with 3CCD-camera and improved with image processing. ILV and protected lung volumes were determined from the digitized portal films. The 3D calculations was automatically computed from their measurements to calculate the ILV. The median ILV in both groups was 466 cm^3. In the "IP" group, the ILV was 484 cm^3 versus 407 cm^3 in the "non-IP" group (P = NS). The median dose-rate was similar between the two groups (0.045 Gy/mn).

Although the difference was not significant, ours findings suggest a higher incidence of IP when the ILV increased. This hypothesis needs to be confirmed by a prospective study.

160b POSTER

CLINICAL *IN VIVO* DOSIMETRY USING OPTICAL RADIATION SENSOR FIBERS

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Purpose: As our previously reported basic investigations indicated, optical loss in silica induced by ionizing radiation may be used for dosimetrical purposes. We tested a novel optical fiber radiation sensor in clinical settings.

Methods: A lead doped silica fiber (diam $\leqslant$ 0.5 mm, L $\approx$, 0.6 m) was rolled up to a circle (diam $\approx$ 15 mm). This ring sensor was put on the closed eye lid during orbital irradiation in order to estimate the surface dose (*SD*) close to the eye lens due to scattered radiation. Patients were treated with bilateral parallel opposed fields (8 MV x-rays, size $\approx 4 \times 4$ cm^2) by reason of Graves' disease, uvea metastases and nasopharynx carcinoma.

Results: We were able to determine the *SD* in all patients in real time. Results are compared with phantom measurements using TLD.