Gy with 4 fractions in 4 days after precise localisation of the tumour by surgical procedure and clips.

Preliminary results, for the 146 patients that have at least one year followup, are as follows. We have observed complete tumour response in 10%, partial response in 70% and stabilisation in 20%.

Precise information about visual results and factors influencing visual results will be given.

146 ORAL

CHOROIDAL METASTASES: TO TREAT OR NOT TO TREAT

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The role of external beam radiation therapy (EBRT) in the management of choroidal metastases (CM) was evaluated retrospectively.

From 1970 to 1993 58 patients with CM of 80 eyes underwent EBRT with doses ranging from 20 to 53 Gy. The female to male ratio was 2.9, median age 59 years. The results of treatment measured by complete response, visual acuity improvement, retinal reattachment and eye conservation was respectively 63%, 75%, 65% and 100%.

Patient characteristics (primary tumor, histology, details of CM) will be presented.

Post-irradiation complications and related technical characteristics of the treatment will be highlighted as well as the relationship between overall survival and primary site.

From our data, EBRT is a very efficient and safe palliative treatment for CM and helps preserving a good vision, thus the quality of life in patients who have a poor overall prognosis.

147 ORAL

ACCELERATED RADIATION WITH CONCOMITANT CARBOPLATIN FOR GLIOBLASTOMA MULTIFORME

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The long-term efficacy and safety of postoperative accelerated fractionated radiotherapy with concomitant carboplatin was evaluated in 83 patients with glioblastoma multiforme. Patients received 2 Gy radiation three times a day for two 5-day cycles separated by 2 weeks. Prior to each radiation treatment a 2-hour intravenous infusion of 33 mg/m^2 carboplatin was administered. Following radiotherapy, patients were to receive procarbazine, CCNU, and vincristine, (PCV) for one year or until tumor progression. Seventy-four patients with a median age of 55 years received at least one course of PCV. Their median survival duration was 55 weeks. Covariates individually predictive of improved survival were younger age ($P < 0.01$), higher Karnofsky performance status ($P = 0.055$), total or subtotal resection vs. biopsy ($P = 0.056$) and smaller radiation volume ($P = 0.008$). Seven patients had documented therapy-induced neurotoxicity.

Accelerated fractionated radiotherapy, as used, enables concomitant full dose administration of chemotherapy or radio sensitizing agents in glioblastoma multiforme.

148 ORAL

CURATIVE MANAGEMENT OF RECTAL ADENOCARCINOMA WITH RADIOTHERAPHY ALONE: A SERIES OF 250 CASES

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This report pools the results of two institutions using since 1970 the strategies developed in Lyon by Jean Papillon. (1) *Low and mid rectum T1 and selected T2 well differentiated adenocarcinoma* treated with intrarectal contact X-ray (ICRT) and interstitial brachytherapy (IBT). Since 1970, 200 patients (113 T1, 87 T2) were treated in Dijon and Lyon-Sud. Transrectal ultrasonography has been used for staging since 1987. Failures rates (unlimited follow-up) are local in 4.5% (T1) and 19.5% (T2), nodel in 0.9% (T1) and 9% (T2), metastatic in 3.5% (T1) and 12.5% (T2). Salvage treatment was successful in 20/24 pelvic failures. Ultimate pelvic control was obtained in 189/200 (94.5%) with preservation of a functional anal sphincter in 95% of PTS with pelvic control. No severe complication occurred. (2)*Low and mid rectum T2 and T3 adenocarcinoma* treated with external radiotherapy (30–39 Gy in 10–13 fr. and 14–17 days to the posterior pelvis. Concomitantly, ICRT delivers 60–80 Gy in 2–3 fr. After a 6- to 8-week rest period, a 20–30 Gy boost is delivered by IBT. Fifty patients were treated (34 T2, 16 T3). Twelve out of 50 (24%) had a local failure (5/12 with a subsequent surgical salvage treatment) resulting in an 82% ultimate control rate with a functional sphincter. G2 complications occurred in 16% (rectorragia/ulcer). A single patient had a G3 necrosis.

149 POSTER

PROGNOSTIC FACTORS IN LUNG CANCER WITH BRAIN METASTASIS

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The role of palliative cranial irradiation and relevant prognostic factors were analyzed prospectively in 103 lung cancer patients who had brain metastasis between October 1991 and December 1994. The male to female ratio was 92/11. Age range was 33–83 (median:59). Histological types were adenocarcinoma 30/103 (29%), epidermoid carcinoma 30/103 (29%), SCLC 27/103 (26%), large cell carcinoma 3/103 (3%), carcinoma without certain histopathological classification 11/103 (11%). Radiotherapy was completed in all except 8 cases. Palliation was accomplished in 92% of the cases. Palliation duration ranged between 0.5–36 months (median: 3). Median survival was 4 months. Extent of brain metastasis (solitary/multiple), presence or absence of metastasis other than brain, local symptom status at the time of brain metastasis and time of brain metastasis were the analyzed prognostic factors. Local symptom status and presence or absence of metastases other than brain were found statistically significant ($P < 0.01$ and $P < 0.05$ respectively).

150 POSTER

CONSTRUCTION AND FIRST EXPERIENCE WITH A CUSTOMIZED "BELLY BOARD" MOULD TO MINIMIZE THE VOLUME OF SMALL BOWEL IN THE IRRADIATION OF PELVIC MALIGNANCIES

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Radiation enteritis is a common complication of radiotherapy for pelvic malignancies, often requiring medical therapy, breaks of the treatment and sometimes the hospitalization or a surgical intervention.

The volume of irradiated small bowel (SB) is considered one of the most important factors in determining gastro-intestinal side effects. Numerous techniques, principally based on the reduction of the irradiated SB volume have been applied to avoid or decrease radiation enteritis. We have realized a customized "belly board" as a bowel minimization device, modifying the original technique of Shanahan (*IJROBP* 1989, 17, 187–88). We use a polyurethane foam mould to place and immobilize the patient in prone position with anterior lower abdominal wall compression. A block of polystyrene in the shape of a reverse pyramid is placed under the superior abdomen during the solidification of the mould to obtain a hole for the displacement of the SB. From October 1994 to March 1995, we have utilized such device in 28 consecutive patients irradiated for pelvic tumours. The mean high dose SB volume irradiated was 56.2 cm^3 (range 0–390) and the partial dose SB volume was 218.5 cm^3 (range 0–588). This technique permits not only the displacement of the SB (favoured also by recommended bladder distension) minimizing the irradiated SB volume, but also contribute to the immobilization of the patient in a comfortable and repeatable position.

151 POSTER

HYPERFRACTIONATED ACCELERATED RADIATION THERAPY IN RADICAL TREATMENT OF CANCER PATIENTS

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Total dose is just one of the factors important to the achievement of success in radiotherapy. Biological higher doses of radiotherapy to the primary site and if involved, to draining lymph nodes have produced higher response rates and suggest that higher doses may result in improved survival. Radical treatment policy in different institutions varies from conventional fractionated schedules to hyperfractionated (accelerated or not) or shorter hypofractionated ones. To achieve this goal in

1990 we commenced a programme of hyperfractionated accelerated radiation therapy consisting of a twice daily irradiation of 1.5 Gy with 6 h interval, to a total dose of 67.5 in 45 fractions in 4.5 weeks. Since 1992 this was escalated to 75 Gy in 50 fractions in 5 weeks. The aspect of this treatment schedule is to allow an isoeffective dose for late tissues, but an increased effective dose for tumours, compared with "standard" radical treatment. So far 320 patients have been treated and following this experience the later schedule is our current practice for radical treatment. In this report we present our results on the effects of this type of treatment regarding acute and late complications. Control rates of radical treatment of carcinomas at different sites will be the subject of future communication.

152 POSTER

NEW METHODOLOGIC APPROACH FOR IRRADIATION PARAMETERS DETERMINATION IN STEREOTACTIC RADIOSURGERY: PRESENTATION OF AN OPTIMIZATION SOFTWARE

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In stereotactic radiosurgery, a very high dose is delivered in one fraction in a small volume. This volume has often a complex form and only a multi-isocentric technique can generate acceptable dose distribution.

The optimum dose distribution obtention needs a lot of trials and time; so we have established an algorithm allowing the simple and fast calculation of each irradiation parameter. This algorithm includes 4 steps:

1. Definition of the geometric criteria of the volume to treat: length, thickness and height.

2. Definition of the irradiation geometry based on equidistant isocenters and such that the minimum dose point, corresponding to the intersection of the bisectors of the segments joining two consecutive isocenters is inside the geometry: isocenters arrangement on line, triangle, square, or complex.

3. Calculation of each irradiation parameter, based on simple formula and graphs: collimator diameter, number and position of the planes containing the isocenters, number and position of the isocenters per plane.

4. Estimation and test of the dose heterogeneity inside the target volume.

With such an approach, all the dose distribution obtained present a dose gradient outside the target volume superior to 5%dose/mm and a dose heterogeneity inside the target volume inferior to 20%dose.

This algorithm can easily be integrated to any existing dose calculation program for stereotactic radiosurgery.

153 POSTER

POST-OPERATIVE VAGINAL HIGH DOSE RATE BRACHYTHERAPY (HDRB) IN ENDOMETRIAL CARCINOMA: THE EXPERIENCE OF CENTRE FRANCOIS BACLESSE 1990–1995

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Introduction: From October 1990 to May 1995, 82 patients (pts) with localized endometrial carcinoma, all histologic grades, were treated at our institution with combination of surgery and irradiation. In all cases, surgery consisted of hysterectomy and annexectomy. Irradiation consisted of HDRB alone (Gr. I: T1a–T1b, NX, N-, M0, with limited myometrial involvement to the 2/3 internal) or in combination with external beam irradiation (Gr. II: T1a–T2 w/wo nodal, ovarian or seral myometrial involvement).

Methods: ^{192}Ir-HDRB was delivered in 4 weekly fractions of 6.2 Gy (Gr. I) or in 1 fraction of 6.5 Gy (Gr. II), defined at 0.5 cm from vaginal wall, including vagina from 1 cm of the uretral meatus to 0.5 cm above the vaginal scare. Dose delivered was measured *in vivo* using LiF included in mold vaginal template (anterior and posterior wall) and in rectal probe (anterior mucosa). External irradiation delivered 43.2 Gy to the pelvis in 18 fractions and 32 days.

Results: Gr. I included 49 pts of whom none have relapsed. Three minor complications were observed: 2 limited, superficial and transient necroses at 17 and 23 month after treatment, confined to the inferior 1/3 of the vagina, and 1 transient erythema confined to internal thigh, 2 weeks after treatment. Gr. II included 33 pts of whom none developed any rectal complication; 3 died from metastases, 1 died from cause unspecified and 3 developed peritoneal progression.

Conclusion: HDRB appears to have similar efficacy and morbidity than low dose rate branchytherapy. However, patients treated with HDRB are all out-patients.

154 POSTER

ANALYSIS OF A POSSIBLE CANCER TREATMENT BASED ON THE RADIOACTIVE CAPTURE REACTIONS PROVIDED BY SM, GD, I-INCORPORATED RADIOSENSITIZERS

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The boron neutron capture is a nuclear reaction which has been used in a suitable technique for cancer treatment. A radiosensitizer for this technique implies in a common amino acid with a boron atom incorporated. A higher thermal capture cross section than one found for boron-10 makes other special isotopes, such as samarium, gadolinium, or iodine which produces xenonium, good candidates to be also used for cancer therapy. However, in these cases, the radioactive capture (n, γ) is the main reaction. The efficiency of the possible radiosensitizers carrying those elements needs to be evaluated through the dose deposition in the tumor region. A possible cancer treatment based on Sm, Gd, I-incorporated radiosensitizers is debated and compared with BNCT. The dose evaluation on simulated cases has been done. The perspective results on this technic show that low activity sources of neutrons can be satisfactorily used in order to produced a level of dose in the tumor region similar to the conventional radiotherapy however using high activity gamma sources.

155 POSTER

CERVIX CARCINOMA: TREATMENT AND RESULTS

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In 1984 we treated 391 patients with cervix carcinoma of all stages (FIGO: st. I—108, st. II—144, st. III—136 and st. IV 3) using Cathetron (HDR Co-60) for brachytherapy and Linear accelerator (10 MeV) for external beam therapy.

The treatment regimen were:

Cathetron: (a) radical irradiation—4 × 1000 cGy/.A. 1 fraction/week, (b) irradiation after surgery—4 × 750 cGy/0.5 cm, 1 fraction/week. Linear accelerator: (a) radical irradiation—4600 cGy, 22 fractions, 2 opposite fields with central lead shields after 2000 cGy, (b) irradiation after surgery—3600 cGy, 18 fractions, 2 opposite field without central shields. The 5-year survival of patients was: st. I—89/108 (82.4%), st. II—104/144 (72.2%), st. III—55/136 (40.4%), st. IV—0/3 (0.0%) and all stages—248/391 (63.4%).

Late post-irradiation sequelae were: 41/391 (10.5%). Local recurrences were: 35/391 (9.0%). Distant metastases: 6.75%.

156 POSTER

ACCIDENTAL OVER IRRADIATION IN BREAST CANCER PATIENTS

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In the Department of Radiation Therapy Vicenza Hospital, in Italy, where the author was working at the time, in September–October 1989 18 breast cancer patients (pts) were treated with electrons of a linac CGR Saturne 20: 12 after limited surgery (stages T1–2 N0 in 9 and T1–2 in 3 pts) and 6 after radical mastectomy (T2–3 N1–2 in 3 treated with radical mastectomy, 1 pt had inflammatory carcinoma and 2 local recurrence, both 5 years after radical surgery). Median age was 50 years (range 38–65). Because of an ionization chambers breakdown, the electron doses were higher (from 78% to 148%) than proposed (50 Gy/25f and boost of 10 Gy/5f). Twelve/18 pts had 25–30 fractions, 3/18 23–24 f, 2/18 22 f and 1/18 19 f. At the end of radiotherapy erythema was noted as follows (ROTG score): grade 1 in 1 pt, grade 2 in 12, grade 3 in 4 and not indicated in 1. Since no dosimetric control was done during the two months, the total dose for each pt is unknown. A dosimetric control was asked for because of consequential late effects (i.e. worsening or persistence of erythema several weeks after the completion of radiotherapy) in pts treated with electrons. In the same period no abnormal affect was noted with photons (18 MV). Late effects were: skin necrosis requiring plastic surgery in 12/18 (6/12 pts had mastectomy after limited surgery); rib fractures in 11/18; pulmonary fibrosis in 12/18; pericardial or cardiac damage (all had left breast cancer) in 5/18. Until now 2 pts died: