

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.

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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.

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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: ¹⁹²Ir-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 urethral 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 brachytherapy. However, patients treated with HDRB are all out-patients.

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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.

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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%.

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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: