29.
RESULTS OF POSTOPERATIVE RADIOTHERAPY IN LOW-GRADE GLIOMAS

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Purpose: To evaluate results, prognostic factors and patterns of failure of the postoperative radiotherapy (PRT) for Low-Grade Gliomas (LGG).

Methods: Between 1985 and 1995, 158 patients with LGG (WHO II) received PRT. There were 116 astrocytomas, 17 mixed oligoastrocytomas, 25 oligodendrogliomas. Median age was 39 years (range: 17-74). Conventional treatment techniques and doses were employed (median total dose- 58 Gy, median dose per fraction – 2 Gy). All known parameters with possible influences on prognosis were analysed in univariate analysis (UA). Then a multivariate analysis (MA) was performed for variables with significance level $p<0.2$ in UA. CT scans taken prior to initial surgery and at the time of recurrence have been compared to define the recurrence pattern in relation to the initial tumour site. Initial and recurrent tumour were drawn in the simulator films in order to precise the failure pattern in relation to irradiated volume. Survival after recurrence (SAR) was analysed using Kaplan-Meier method and prognostic factors were analysed using logrank test.

Results: The minimum follow-up period for alive patient was 52 months. The 5- and 10-year actuarial overall survival rate were 55- and 41% respectively. The actuarial progression free survival rate were 48% and 29% for 5 and 10 years respectively. MA revealed that good WHO performance status ($p=0.00001$), duration of symptoms before treatment >12 months ($p=0.00003$), seizures at presentation ($p=0.0001$), age < 45 years ($p=0.01$) and gross total resection ($p=0.03$) are associated with increased survival.

Median time to recurrence was 49.5 months (range: 1-134). The precise localisation of recurrence was possible in 69 pts (73%). All but three pts recurred within the initial tumour margin. Two of them recurred at 1-3 cm of the initial tumour margin, one recurred at distance, in the controlateral hemisphere. The last one was the only case of recurrence outside the previously irradiated volume. Median SAR was 8 months (range: 0.5-43). Information about treatment of recurrence was available in 76 pts (81%) – (11 - surgery, 9 – surgery and chemotherapy, 2 – surgery and radiotherapy, 8 – surgery, radiotherapy and chemotherapy, 1 – radiotherapy, 19 – chemotherapy, 26 – supportive care). There was no correlation between any treatment method and patient related parameters in the Spearman's rank test. In univariate analysis only addition of chemotherapy to recurrence management ($p=0.001$) and duration of symptoms before initial surgery >12 months ($p=0.004$) were associated with increased SAR. Surgery at recurrence and patient related parameters (age, performance status, neurologic function, seizures) did not influence survival.

Conclusions: Long-term results of the treatment were unfavorable for a majority of patients with LGG. Good WHO performance status, duration of symptoms before treatment >12 months, seizures at presentation, age < 45 years and gross total resection are associated with increased survival. Our data confirm that limited-volume irradiation for LGG is an adequate approach. Management of failures after PRT of brain tumours remains a therapeutic challenge. Our results show that chemotherapy at recurrence significantly improves survival. Surgery was not effective treatment at recurrence.

30.
PROGRESS IN PALLIATIVE RADIOTHERAPY

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Palliative irradiation is given to about 40% of cancer patients receiving radiotherapy. The large number of patients stand in sharp contrast to the scarce number of publications related to this type of cancer therapy. It is necessary to emphasize that palliative radiotherapy should be administered according to the different principles than curative treatment. The general principles governing palliative use of irradiation, defined by R. Paterson in 1956, seem to be still valid, However, since that time a substantial progress has been made. The main elements of this progress, and the main directions of research are related to:

1. optimisation of fractionation schedules /including hyperfractionation/;

2. re-irradiation;
3. brachytherapy;
4. integration of radiotherapy with the other methods of palliative and symptomatic care.

31.
ENDOVASCULAR BRACHYTHERAPY

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32.
QUALITY ASSURANCE FOR NEW TECHNIQUES OF BRACHYTHERAPY

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In addition to classical HDR, PDR or LDR brachytherapy, new techniques such as transperineal radioactive implantations of the prostate via template guidance, or vascular brachytherapy for the prevention of restenosis, are becoming increasingly popular. At the same time they are introduced in a department, a quality assurance program must be implemented both to minimize the risks of treatment misadministrations and to prove respect to legal liability.

The authors try to point out the necessary equipments and the particularities of Q.A. programs which must cover all the steps of the treatment. They consider successively prostate and vascular brachytherapy, making for each of them, a quick review of the most current techniques (including associated accessories and imaging devices), showing the particularities of adapted computerized treatment planning systems and the characteristics of radioactive sources usually used (photon sources for prostate such as ^{192} Ir for temporary implants and ^{125}I and ^{103} Pd for permanent implants, ^{192} Ir or bêta sources for vessels). Particular detectors and methods to be employed to perform quality controls of equipments and sources, or in vivo measurements, are also presented. Lastly the guidelines and recommendations for "good practice and quality assurance" concerning these particular techniques and published by different international organizations, or which are in the process of development, are summarized. It will be noted that volume definitions, dose prescription and reporting, dose planning, dosimetry, staffing and responsabilities,etc, are or should be included in a complete quality assurance program.

33.
LAST RESULTS AND LESSONS OF THE ESTRO EUROPEAN NETWORK ON QUALITY ASSURANCE IN RADIOTHERAPY

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State of the Art: The EQUAL Dosimetry audit service, set-up by the ESTRO in 1998[a], is well-known through large numbers of TL-dosimeters sent to hospitals to be irradiated in clinically relevant conditions, and read at the EQUAL Measuring Laboratory, IGR, Villejuif.

All European countries have now applied to participate (404 centres out of 880) for photon and electron beams. In relation with the IAEA, this service has been extended to 27 centres of 7 countries from Eastern and Central Europe, and the Mediterranean Basin. 757 photon beams and 277 electron beams have been checked according to the "on the beam axis" procedure.

Results and outcome:

- Reference beam output results demonstrating improvements with respect to the former EC Network, and good reliability of the procedure : mean ratios of measured to stated dose of 0.997 (SD 1.8%) for photon beams, and 1.003 (SD 2.1%) for electron beams.
- Useful service detecting 7% of the photon beams presenting at least one check point with a deviation > 5% (2% for electron beams, but 3 times more deviations between 3 and 5%).
- Re-checks and on-site visits in 8 centres reveal inaccuracies in TPS algorithms or input data and/or in local measurements (wedge factors, collimator aperture factors, PDD's, beams calibrations).

Conclusion: A number of dosimetric problems are still observed, even on the beam axis. Improvements should be introduced and checked before considering more sophisticated treatment techniques.

[a] The present ESTRO-EQUAL Project (MORQA) has been funded by an EU contract.