Tumori, 95: 329-337, 2009

Three-dimensional conformal radiotherapy, temozolomide chemotherapy, and high-dose fractionated stereotactic boost in a protocol-driven, postoperative treatment schedule for high-grade gliomas

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ABSTRACT

Aims and background. No available scientific report deals with high-dose (≥70 Gy) radiotherapy plus temozolomide chemotherapy (TMZ CHT) in high-grade gliomas. The survival results of a protocol-driven, postoperative treatment schedule are reported here to contribute to the discussion on this issue.

Methods and study design. Uniform criteria were prospectively adopted for case selection during the period 1993-2006 in the management of 123 patients, and we progressively introduced three-dimensional conformal radiotherapy (3D-CRT, 60 Gy), TMZ CHT and a high-dose (70 Gy) stereotactic boost (HDSRT) in the treatment schedule. Palliative radiotherapy was delivered by whole brain irradiation (WBI, 50 Gy) for bulky tumors, whereas radical irradiation was performed with 3D-CRT throughout the study period. Two periods of accrual are considered: 36 patients were treated before 31 December 1999 (29.25%) and 87 (70.75%) after 1 January 2000. This subdivision was due to the implementation of HDSRT hardware and TMZ CHT from January 2000.

Results. The median overall survival was 13 months and the 1-, 2- and 3-year survival rates were 53%, 19.5% and 11.6%, respectively. The differences in survival related to the treatment variables were highly significant, both in univariate and multivariate analysis. The median survival and 1-, 2- and 3-year survival rates in the palliative WBI group were 9.75 months and 37%, 2%, and 0%, respectively; in the 3D-CRT group 17.25 months and 64%, 34%, and 15%, respectively; in the TMZ CHT concomitant with radiotherapy group 20 months and 61%, 39%, and 21%, respectively; in the TMZ CHT concomitant with and sequential to radiotherapy group 25.75 months and 84%, 54%, and 26%, respectively, and in the HDSRT group 22 months and 72%, 48%, and 37%, respectively. No symptomatic radiation necrosis occurred in any of the groups.

Conclusions. The results reported here are generally better than those reported in the literature. The selection of patients on the basis of favorable prognostic factors and suitability to the currently available, aggressive postoperative treatment resources can be the mainstay for improving therapeutic results. In particular, the new treatment option reported here (HDSRT in association with TMZ CHT) proved to be safe and effective in obtaining a relatively favorable outcome.

Key words: high-grade glioma, radiotherapy, high-dose boost, chemotherapy, temozolomide.

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Received September 17, 2008;
accepted November 21, 2008.