

Comparative analysis of temozolomide (TMZ) versus 1,3-bis(2-chloroethyl)-1 nitrosourea (BCNU) in newly diagnosed glioblastoma multiforme (GBM) patients

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Abstract *Purpose* Although TMZ replaced BCNU as the standard initial chemotherapy in the treatment of GBM, no studies have been reported comparing BCNU with TMZ. We therefore did a retrospective analysis comparing these agents as initial therapy in GBM. *Patients and methods* Eighty-one patients with GBM in our institution received both radiation and chemotherapy as initial treatment after surgery or biopsy; 49 receiving BCNU and 32 TMZ. These were analyzed for overall survival (OS) and progression-free survival (PFS) versus the type of chemotherapy used. The influence of salvage therapy on the outcome was investigated also. *Results* Median OS was superior in the TMZ versus the BCNU group (15.9 vs. 11.5 months) and the curves were judged to be significantly different by the log-rank test; $P < 0.02$. However, PFS was not significantly different between the two groups. Bevacizumab plus irinotecan (BI) was used as salvage therapy in one-third of the TMZ patients but in none of the BCNU patients. When patients receiving BI were omitted from the TMZ group the

OS curve overlapped that of BCNU patients. *Conclusion* These data suggest that the superior OS of the TMZ-treated GBM patients was not due to better tumor control by TMZ but was possibly related to the newer salvage therapy that was available to them.

Keywords Temozolomide ·
1,3-Bis (2-chloroethyl)-1 nitrosourea · BCNU ·
Glioblastoma multiforme · Malignant glioma ·
Prognostic factors · Salvage therapy ·
Adjuvant chemotherapy · Bevacizumab

Introduction

Several meta-analyses have shown modest but real benefit to the use of adjuvant chemotherapy in the treatment of GBM [1–7]. Although its usefulness has been debated, BCNU, the agent most often used in these trials, had been the standard of care until the report by Stupp et al. [8] in 2001 on the use of TMZ in conjunction with radiotherapy which showed a 71% 1-year survival compared to 40–50% reported in the literature. After a randomized trial reported in 2005 [9] showed that TMZ given concomitantly and after radiotherapy improved survival over radiotherapy alone in GBM, TMZ became the standard concomitant and adjuvant chemotherapy for this tumor [10]. However, there have been no reported studies comparing TMZ versus BCNU as concomitant and/or adjuvant chemotherapy in GBM.

We therefore did a retrospective analysis over a 17-year period of OS and PFS of patients with GBM who had initial therapy, in earlier years, with BCNU and radiation and compared them to patients treated more recently with TMZ and radiation.

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