Limited Margins Using Modern Radiotherapy Techniques Does Not Increase Marginal Failure Rate of Glioblastoma.


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Abstract

OBJECTIVE:: We investigate the patterns of failure in the treatment of glioblastoma (GBM) based on clinical target volume (CTV) margin size, dose delivered to the site of initial failure, and the use of temozolomide and intensity-modulated radiotherapy (IMRT).

METHODS:: Between August 2000 and May 2010, 161 patients with GBM were treated with radiotherapy with or without concurrent temozolomide. Patients were treated with CTV expansions that ranged from 5 to 20 mm using a shrinking field technique. Patterns of failure and time to progression and overall survival were compared based on CTV margin, use of temozolomide, and use of IMRT. Kaplan Meier analysis was used to estimate survival times, and χ test was used for comparison of cohorts. RESULTS:: For patients treated with 5-, 10-, and 15- to 20-mm CTV, 79%, 77%, and 86% experienced failures in the 60 Gy volume, respectively. Forty-eight percent, 55%, and 66% of patients with 5-, 10-, and 15- to 20-mm CTV experienced failures in the 46 Gy volume, respectively. There was no statistical difference between patients treated with 5-, 10-, 15- to 20-mm margins with regard to 60 Gy failure (P=0.76), 46 Gy failure (P=0.51), or marginal failure (P=0.73). Eighty percent of patients receiving temozolomide experienced failures in the 60 Gy volume. There was no increased likelihood of marginal failures in patients receiving IMRT (P=0.97). CONCLUSIONS:: Modern treatment techniques including use of concurrent temozolomide, limited CTV margin size, and IMRT have not greatly changed the patterns of failure of GBM.

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