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Semicontinuous Low-Dose-Rate Teletherapy for the Treatment of Recurrent Glial Brain Tumors: Final Report of a Phase I/II Study.

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Abstract

PURPOSE: Semicontinuous low-dose-rate teletherapy (SLDR) is a novel irradiation strategy that exploits the increased radiosensitivity of glial cells in a narrow range of reduced dose rate. We present the final report of a prospective Phase I/II study testing the feasibility of SLDR for the treatment of recurrent gliomas.

METHODS AND MATERIALS: Patients with previously irradiated recurrent gliomas were enrolled from November 1993 to March 1998. Patients received SLDR, delivered 6 to 8 hours/day at a dose rate of 40 to 50 cGy/hour for a total dose of 30 to 35 Gy given over 12 days using a modified cobalt-60 treatment unit. Acute central nervous system toxicity after SLDR treatment was the primary endpoint. Overall survival was a secondary endpoint.

RESULTS: Twenty patients were enrolled (14 World Health Organization Grade 4 glioma, 5 Grade 2 glioma, 1 ependymoma). No patients developed \geq Grade 3 central nervous system toxicity at 3 months without radiographic evidence of tumor progression. Overall survival after SLDR was 56% at 6 months, 28% at 12 months, and 17% at 24 months. One patient survived >48 months, and 1 patient survived >60 months after SLDR treatment. Re-resection before SLDR treatment significantly improved 1-year overall survival for all patients and patients with Grade 4 glioma.

CONCLUSION: The delivery of SLDR is feasible in patients with recurrent gliomas and resulted in improved outcomes for patients who underwent re-resection. There were 2 long-term survivors (>48 months). This pilot study supports the notion that reduced dose rate influences the efficacy and tolerance of reirradiation in the treatment of recurrent gliomas.

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