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Effects of radiotherapy after hyperbaric oxygenation on malignant gliomas

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The purpose of this non-randomized trial was to evaluate the efficacy of radiotherapy combined with hyperbaric oxygen (HBO) in patients with malignant glioma. Between 1987 and 1997, 29 patients in whom computerized tomography (CT) or magnetic resonance imaging (MRI) scans showed post-operative residual tumours were locally irradiated with nitrosourea-based chemotherapy. Treatments were consecutively combined with HBO at two institutions since 1991 and 1993. Fifteen patients were irradiated daily after HBO, and the periods of time from decompression to irradiation were within 15 and 30 min in 11 and four patients respectively. Fourteen other patients were treated without HBO. Tumour responses were assessed by CT or MRI scans and survival times were compared between the treated groups. In the HBO group, 11 of 15 patients (73%) showed $\geq 50\%$ tumour regression. All responders were irradiated within 15 min after decompression. In the non-HBO group, four of 14 patients (29%) showed tumour regression. The median survivals in patients with and without HBO were 24 and 12 months, respectively, and were significantly different ($P < 0.05$). No serious side-effects were observed in the HBO patients. In conclusion, irradiation after HBO seems to be a useful form of treatment for malignant gliomas, but irradiation should be administered immediately after decompression.