ABSTRACT

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Characteristics and therapeutic strategies of radiation-induced glioma: case series and comprehensive literature review.

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INTRODUCTION: The so-called radiation-induced glioma (RIG, a secondary glioma after cranial irradiation), is a serious late effect after cranial radiation therapy. The clinical characteristics of and ideal treatment for these tumors are unclear. We analyzed our case series and conducted a comprehensive literature review to reveal the precise characteristics of RIGs.

METHODS: We analyzed the cases of six patients with RIGs treated at our institution and 354 patients with RIGs from the literature. The latency period from irradiation to the development of each RIG and the median overall survival of the patients were subjected to Kaplan-Meier analyses. Spearman's correlation test was used to determine the relationship between age at irradiation and the latency period.

RESULTS: The mean age of the 360 patients at the development of RIG was 27.42 ± 17.87 years. The mean latency period was 11.35 ± 8.58 years. Multiple gliomas were observed in 28.4%. WHO grade 3 and 4 RIGs accounted for 93.3%. The latency periods were significant shorter in the higher WHO grade group ($p = 0.0366$) and the concomitant systemic chemotherapy group ($p < 0.0001$). Age at irradiation was negatively associated with the latency period ($r = -0.2287$, $p = 0.0219$). The patients treated with radiotherapy achieved significantly longer survival compared to those treated without radiotherapy ($p = 0.0011$).

CONCLUSIONS: Development in younger age, multiplicity, and high incidence of grade 3 and 4 are the clinical characteristics of RIGs. Cranial irradiation at older ages and concomitant chemotherapy were associated with shorter latency for the development of RIG. Radiation therapy may be the feasible treatment option despite radiation-induced gliomas.

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