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Stereotactic Radiosurgery for World Health Organization Grade 2 and 3 Oligodendroglioma: An International Multicenter Study

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Abstract

Background and objectives: Oligodendrogliomas are primary brain tumors classified as isocitrate deshydrogenase-mutant and 1p19q codeleted in the 2021 World Health Organization Classification of central nervous system tumors. Surgical resection, radiotherapy, and chemotherapy are well-established management options for these tumors. Few studies have evaluated the efficacy of stereotactic radiosurgery (SRS) for oligodendroglioma. As these tumors are less infiltrative than astrocytomas and typically recur locally, focal therapy such as SRS is an appealing option.

Methods: This study was performed through the International Radiosurgery Research Foundation. The objective was to collect retrospective multicenter data on tumor control, clinical response, and morbidity after SRS for oligodendroglioma. Inclusion criteria were age of 18 years or more, single-fraction SRS, and histological confirmation of grade 2 or 3 oligodendroglioma. The primary end points were progression-free survival (PFS) and overall survival from SRS. Secondary end points included clinical evolution and occurrence of adverse radiation events or other complications. Descriptive statistics, Kaplan-Meier analyses, and univariate and multivariate analyses were performed.

Results: Eight institutions submitted data for a total of 55 patients. The median follow-up time was 24 months. The median age at SRS was 46 years, and the median Karnofsky Performance Status was 90%. The median marginal dose used was 15 Gy. The median PFS was 17 months, with actuarial rates of 60% at 1 year, 31% at 2 years, and 24% at 5 years after SRS. Factors significantly associated with worsened PFS were World Health Organization grade 3, previous radiotherapy and chemotherapy, and higher marginal dose. The median overall survival post-SRS was 58 months, with actuarial rates of 92% at 1 year, 83% at 2 years, and 49% at 5 years. Karnofsky Performance Status remained stable post-SRS in 51% and worsened in 47% of patients, most often because of tumor progression (73%). Radiation-induced changes occurred in 30% of patients, of which only 4 were symptomatic.

Conclusion: SRS is a reasonable management option for patients with oligodendroglioma.