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Unveiling the Efficacy of Gamma Knife Radiosurgery for Tectal Plate Gliomas

Nülifer Kilic Durankus¹, Yavuz Samanci², Ali Haluk Düzkalir³, Selcuk Peker²

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Abstract

Background and objectives: Tectal plate gliomas (TPGs) are midbrain tumors that grow slowly and have a benign clinical course. Most TPGs are low-grade astrocytomas, but they can encompass various histological tumor types. Gamma Knife radiosurgery (GKRS) is being explored as a potentially safe and effective treatment option for TPGs, although research in this area is limited. This study aims to evaluate GKRS's efficacy and safety in patients with TPG and provide a comprehensive review of existing literature on the topic.

Methods: This retrospective, single-center study included 48 patients with consecutive TPG who underwent GKRS between September 2005 and June 2022. Patients diagnosed with TPGs based on radiological or tissue-based criteria and who had a minimum follow-up period of 12 months were eligible for inclusion. The primary end points were local control and the absence of GKRS-associated or tumor-associated mortality and morbidity.

Results: During a median follow-up of 28.5 months (range, 12-128), the radiological assessment showed tumor control in all cases, with 16.7% achieving a complete response and 68.8% achieving a partial response. Pseudoprogression occurred in 6.2% of cases, with onset ranging from 3 to 8 months. Clinical outcomes revealed no permanent neurological deterioration, with symptoms improving in 14.6% of patients and remaining stable in the others. One patient in the pseudoprogression group experienced transient Parinaud syndrome. One patient died during follow-up because of unrelated causes. The mean survival time after GKRS was 123.7 months. None of the clinical, radiological, or radiosurgical variables showed a correlation with partial/complete response, clinical improvement, or overall survival.

Conclusion: There is limited research available on the management of TPGs, and this study presents the largest patient cohort treated with GKRS, along with a substantial follow-up duration. Despite its limitations, this study demonstrates the efficacy and low-risk profile of GKRS for TPGs.

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