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Abstract

Published 03/05/2025

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Outcomes of Gamma Knife Radiosurgery for Motor Cortex Meningiomas

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Categories: Medical Physics, Radiation Oncology

Keywords: gamma knife radiosurgery, motor cortex meningiomas

How to cite this abstract

Almeida N, Berger A, Prasad S, et al. (March 05, 2025) Outcomes of Gamma Knife Radiosurgery for Motor Cortex Meningiomas. Cureus 17(3): a1466

Abstract

Objectives:

Gamma Knife Radiosurgery (GKRS) is an effective and commonly implemented treatment for primary intracranial tumors and cranial metastases. Meningiomas near the motor cortex are associated with neurological deficits and tumors in this region are often deemed unresectable. GKRS has been shown to deliver a highly conformal tumoricidal dose and effectively treats lesions while sparing neurological and motor function. We investigated the clinical, imaging, and survival outcomes in patients with motor cortex meningiomas treated with GKRS. Specifically we report for the first time long term outcomes and effective tumor control of GKRS for meningiomas in the eloquent location of the motor cortex.

Methods:

We investigated outcomes for Gamma Knife radiosurgery (GKRS) for meningiomas of the motor cortex. Specifically, we analyzed characteristics of the patient population, SRS efficacy, survival analysis. To assess the efficacy of GKRS, we fit the linear mixed model to analyze the changes in KPS scores over time, and we reported the frequency and proportion of different neurological outcomes at each follow-up points. Survival analysis entailed univariate analysis demonstrating the association of each outcome with the demographic/clinical features and then a multivariate analysis was applied using multivariable Cox regression model.

Results:

Regarding neurological outcomes, neurological outcomes at first follow up was shown to have significant association (p-value = 0.006) with the overall survival in the multivariate analysis. This indicated a strong protective effect against the hazard when the neurological outcome is unchanged from baseline at the first follow-up. Our results illustrate there is no significant difference in the overall survival for the group with small tumors < 9 cc and large tumors > 9cc (p-value = 0.7146) and also there is no significant difference in the overall survival with GKRS dosage < 18 Gy and GKRS dosage > 18 Gy (p-value = 4369).

Conclusion(s):

GKRS affords a high rate of preservation of neurologic function for patients with meningiomas of the motor cortex with excellent longitudinal tumor control.