Role of Gamma Knife surgery for intracranial atypical (WHO Grade II) meningiomas.

Hanakita S, Koga T, Igaki H, Murakami N, Oya S, Shin M, Saito N.
Departments of Neurosurgery and.

Abstract

Object Atypical meningioma often recurs even after resection. As a salvage modality, radiotherapy or stereotactic radiosurgery (SRS) is attempted for this aggressive tumor. This retrospective study was performed to evaluate the efficacy of SRS that involved Gamma Knife surgery (GKS) for atypical meningioma. Methods The authors reviewed records from 22 patients with histologically proven atypical meningioma who underwent GKS for 28 lesions at the authors’ institute. The median patient age was 70 years (range 24-91 years), and the median tumor volume for each procedure was 6.0 cm$^3$ (range 1.6-38.7 cm$^3$). The margin dose ranged from 14 to 20 Gy (median 18 Gy). Follow-up periods ranged from 3 months to 98 months (median 23.5 months). Results In total, 39 GKS procedures were performed for 28 lesions. The local control rates at 1, 2, and 5 years were 74%, 39%, and 16%, respectively. Volume less than 6 cm$^3$ ($p = 0.01$), a margin dose higher than 18 Gy ($p = 0.02$), and a Karnofsky Performance Scale (KPS) score of 90 or more ($p = 0.02$) were factors associated with a longer duration of tumor control in the univariate analysis. Conclusions Atypical meningioma could be more successfully controlled when a higher margin dose was used to treat patients with a good performance (KPS score of ≥ 90) status and smaller tumor volumes. It would be desired if patients are treated with a relatively higher margin dose, ideally as high as the dose applied for malignant tumor. A boost SRS after fractionated radiotherapy may be effective to achieve better local control.

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