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Gamma Knife radiosurgery for skull base meningioma: long-term results of low-dose treatment
Clinical article

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Abbreviation used in this paper: GKS = Gamma Knife radiosurgery.

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Object

In this study, the authors evaluate the long-term results after Gamma Knife radiosurgery of cranial base meningiomas. This study is a follow-up to their previously published report on the early results.

Methods

Between January 1994 and December 2001, the authors treated benign cranial base meningiomas in 108 patients using low-dose Gamma Knife radiosurgery. The tumor volumes ranged from 1.7 to 55.3 cm³ (median 8.1 cm³), and the radiosurgery doses ranged from 8 to 12 Gy (median 12 Gy) to the tumor margin.

Results

The mean duration of follow-up was 86.1 months (range 20–144 months). Tumor volume decreased in 50 patients (46%), remained stable in 51 patients (47%), and increased (local failure) in 7 patients (6%). Eleven patients experienced tumor recurrence outside the treatment field. Among these patients, marginal failure was seen in 5 and distant recurrence was seen in 6. Seven patients were thought to have malignant transformation based on histological or radiological characteristics of the lesion. The actuarial progression-free survival rate, including malignant transformation and outside recurrence, was 93% at 5 years and 83% at 10 years. Neurological status improved in 16 patients (15%). Permanent radiation injury occurred in 7 patients (6%).

Conclusions

Gamma Knife radiosurgery is a safe and effective treatment for cranial base meningiomas as demonstrated with a long-term follow-up period of > 7 years. Surgeons must be aware of the possibility of treatment failure, defined as local failure, marginal failure, and malignant transformation; however, this may be the natural course of meningiomas and not related to radiosurgery.

KEYWORDS: gamma knife; meningioma; radiosurgery; skull base.

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