The Efficiency of Sterotactic Radiosurgery in Residual and Recurrent Grade I Menengiomas

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Introduction

Meningiomas are the most frequent benign intracranial tumors. Although microsurgery is gold standart treatment for meningiomas,stereotactic radiosurgery is a safe and effective option for tumors smaller than 3 cm. In this study,we aimed to analyze the results of stereotactic radiosurgery in 270 patients with residual or recurrent gradeI meningiomas.

Methods

Retrospective review of 661 patients, who were treated in Gazi University Gamma Knife Center between 2004-2013 was performed. 270 patients (40.8%) had undergone prior resection and histopathological result was grade 1 meningiomas. Grade 2 (26 patients) and 3 (6 patients) meningiomas were excluded. Total 270 patients (96 women, 174 men) were reviewed. The median follow-up was 78.1 months. The location, volume, dose, number of shots, prescription rates, complications, response rates were analysed.

Results

The median age was 63years(55-83). The median irradiated tumor volume was 9800.0 mm3(1500-40200). The median tumor prescription ratio was 99.91%. The median dose was 14.1(10-15) Gy. The tumor control rate was:%96.9 (no growth in %75.1, volume reduction in %21.8). Increase in volume was seen in 8 patients (%2.9) and re-operation was performed in one of them (0.37%).

Stereotactic radiosurgery was perfomed again in 7 patients(3.7%). The location of the tumors were as follow: 35.5% petroclival, 32.9% sellar – parasellar, % 8.8 sphenoid wing, %7.4 cerebellopontin cistern, 7.0% parasagittal and parafalcine, %4.7 multiple and 3.7% was other locations. 58 patients(21,4%) had neurological symptoms before gamma knife due to surgery or tumor. New neurological deficits or worsening of the symptoms occured in 3 (%1.1) patients. Non-specific symptoms like headache, dizziness etc were detected in 3.1% of the patients. Improvement in neurological deficit (better visual acuity) was determined in 2 patients(0.7%). In this study, the only independant factor for progression of tumor after gamma knife was the presence of multiple meningiomas. The age, sex, location, dose, prescription ratio did not significantly effect the tumor control rate. In 8 patients who did not respond radiosurgery, tumor progression was detected after 60 months of treatment.

Conclusions

Stereotactic radiosurgery should not be considered as the primary treatment for lesions with mass effect which require decompression. Safer microsurgical resection of meningiomas can be achieved by only debulking and leaving the critical parts of the tumor like cavernous sinus or surrounding cerebral arteries for stereotactic radiosurgery. Only decompression of critical structures like optic nerve and brainstem, leaving critical parts of the tumor for stereotactic radiosurgery is also a rational treatment option. This strategy provides safe and effective treatment of meningiomas.

Learning Objectives

- Treatment options in intracranial meningiomas
- Effectiveness of GammaKnife radiosurgery for Grade 1 meningiomas.

Patient demographics, tumor characteristics and treatment parameters

Age	
Median	63.0
Range	55-83
Follow-up (months):	
Median	78.1
Range	55-108
Volume	
Median	9800.0
Range	2700-47700
Dose	
Median	14.1
Range	10-15
Sex	
Female	96 (35.6%)
Male	174 (64.4%)
Location	
Petroclival	96 (35.5%)
Parasagittal and parafalcine	19 (7.0%)
Sellar-Parasellar	89 (32.9%)
Sphenoid wing	24 (8.8%)
Cerebellopontine	20 (7.4%)
Other	10 (3.7%)
Multiple	12 (4.7%)
Prescription	
Median	99.9
Range	99-100