

Efficacy and Safety of Primary Stereotactic Radiosurgery in Patients with Intraventricular Meningiomas

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Abstract

Objective: Intraventricular meningiomas (IVMs) are a rarity. Tumor characteristics of IVMs often prevent surgeons from completing gross total resections, leading treating physicians to opt for stereotactic radiosurgery (SRS) as a primary or adjuvant treatment modality, especially in elderly patients or high-risk surgical candidates. Yet primary SRS in patients with IVMs remains controversial, as the development of life-threatening peritumoral or panhemispheric edema has sometimes been observed. We present new data regarding the efficacy and safety of patients with IVMs treated with primary SRS.

Methods: A cohort of 33 patients with IVMs was retrospectively identified from the treatment log of a large referral center for neuro-oncology. All patients were treated with primary SRS between 1999 and 2015 at the same radiation oncology department. All patients were treated with GammaKnife SRS and systematically followed up by treating physicians. Data regarding demographics and clinical follow-up was extracted from the medical records system. Treatment and imaging data was obtained from the neuro-radiology imaging and radiotherapy treatment planning systems.

Results: The mean age of the 33 patients under study was 53 years old, with 24 (73%) of patients being female. The majority of lesions was located in the lateral ventricles (97%). Specifically, the right trigone had the highest number of IVMs (52%). In terms of clinical signs and symptoms upon presentation, headaches were the most common (48.5%), followed by dizziness (30.3%). Three patients did not have recorded data for the specifics of their SRS treatment. The mean size of tumor of the other 30 patients was 8.7cm³ with a range of 0.6-44.55cm³. For SRS treatment, the mean percent dose was 48.3% and a mean dosage of 1390.9 cGy with a central mean dose of 2887.1 cGy. The mean focus number was 3.5 and a total time for SRS treatment was a mean of 1508.6 seconds. Of the 33 patients in this cohort, follow-up data was obtained for 21 of the patients. Of these patients, 14 were reported to show a reduction in tumor size. Seven patients showed no change. And no patients had a recurrence. The mean follow-up time period was about 8 years post SRS treatment with a minimum follow-up of about 2 years and a maximum follow-up of nearly 18 years. On follow-up, 32 patients had a significant increase in mean Karnofsky Performance Status (KPS) after SRS treatment (~80% pre-SRS, ~90% post-SRS) and a decrease in symptom load. IVMs were identified on imaging from T1-weighted MRI imaging, where lesions displayed the classic radiological signs of meningiomas, isodense uniform contrast-enhancing masses with "dural tails" rounding the perimeter of the lesions.

Conclusion: The field of IVM management remains complex and challenging - while such lesions are generally hard to come by surgically, SRS has revolutionized treatment. In this largest available cohort to date, we report very good treatment efficacy and low toxicity in patients with a long follow-up period.