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Outcomes of Definitive and Adjuvant Radiosurgical Management of High Grade Vestibular Schwannomas

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Abstract
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Abstract

Objective: Despite excellent local control with definitive SRS for management of vestibular schwannomas, surgical resection is commonly performed for large lesions abutting or displacing the brainstem (Koos 3-4). At our institution, we have typically favored a strategy of subtotal resection followed by SRS, but are increasingly using SRS alone in well selected patients. We look to assess both local control and treatment related toxicity using this approach.

Methods: We retrospectively reviewed all patients treated on our Gamma Knife platform from March 2014 to January 2021 that were clinically diagnosed as having a Koos Grade 3 or 4 vestibular schwannomas. Appropriate clinical, radiographic, and treatment details were recorded in our institutional IRB approved database. Toxicity data were recorded as per CTCAE Version 5. Tumor control was recorded based on RECIST criteria.

Results: A total of 38 patients were identified. Median age was 54 years and median follow-up 2.8 years. Definitive SRS was prescribed in 23 pts (Koos 3, n=13; Koos 4, n=10), and initial surgical resection with post-operative SRS in 15 pts (Koos 3, n=2; Koos 4, n=13). 33 patients were treated with single fraction SRS to a median dose of 12 Gy (range 12 - 14). 5 Patients were treated with hypofractionated SRS (3-5 fractions) to a median dose of 25 Gy (range 21 - 25). Zero local failures after SRS have been reported. In patients receiving definitive SRS (n=23), median tumor size was 2.8 cc (range 1.4 cc - 13.5 cc). Baseline symptoms included CN V palsy (n=2), VN VII palsy (n=1), ataxia (n=10) and vertigo (n=6). Following definitive SRS, no patients developed acute hydrocephalus, required prolonged steroid courses, or developed radiographic/clinical brainstem necrosis. 4 patients had worsening of baseline neurological symptoms including grade 2 vertigo (n=1), grade 1 CN VII (n=1) and grade 1 CN V palsy (n=1). 8 patients had improvement in pre-treatment symptoms including 2 patients with partial or complete resolution of grade 2 ataxia and cranial neuropathies. 2 patients had no documented follow-up visits. Baseline symptoms in patients treated with initial surgical resection (n=15) included CN V palsy (n=7), CN VII palsy (n=3), vertigo (n=7), and ataxia (n=8). Post-operative toxicities included new CN VII palsy (n=5), CN V palsy (n=3), grade 3 dysphagia requiring PEG tube (n=2), and CSF leak (n=2). Median time from surgery to SRS was 5.4 months (range 0.9 mo - 10.4 mo). 4 patients had resolution of ataxia and/or vertigo. New cranial neuropathies were not seen following post-operative SRS.

Conclusion: In well selected patients with Koos 3 or 4 vestibular schwannomas, SRS as the sole treatment demonstrates excellent local control with limited toxicity. Our data suggest that patients should be stratified for surgical intervention based on pre-treatment clinical symptoms and quality of life rather than tumor volume or Koos grade.