Management Outcomes of Facial Nerve Schwannomas: A Comprehensive Single-Institution Experience

Ahed H. Kattaa, MD, David J. Park, MD, PhD, Amit R. Persad, MD, Shagun Ravi Nasta, MD, Paul Harary, BA, Harini Voruganti, BA, Isabelle Lee, BA, Yusuke S. Hori MD, Sara C. Emrich, NP, Armine Tayag, NP, Louisa Ustrzynski, DNP, MBA, Steven D. Chang, MD, MBA

Department of Neurosurgery, Stanford University School of Medicine, Stanford, CA, United States

INTRODUCTION

- Facial nerve schwannomas (FNS) are rare benign tumors originating from Schwann cells of the seventh cranial nerve. Managing FNS is complex, involving a balance between surgical resection and observation, with the primary goal of preserving facial nerve function. Stereotactic radiosurgery (SRS) is emerging as an alternative.

OBJECTIVES

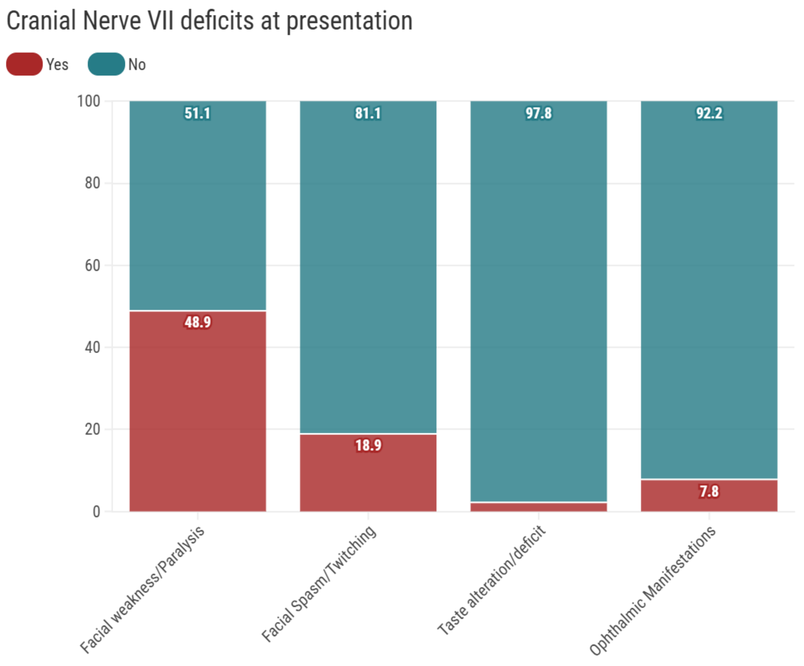
- This study aims to evaluate the efficacy and safety of SRS in managing FNS compared to surgical resection and observation.

METHODS

We performed a retrospective analysis of patients diagnosed with FNS at our institution between 1992 and 2024. Demographic, clinicopathologic, radiologic and treatment data were collected. Statistical analyses included Fisher's Exact test and ANOVA where appropriate.

RESULTS

- We analyzed 85 patients with 90 tumors. Nineteen tumors were treated with SRS (21.1 %), thirty-six with surgical resection (40 %), and thirty-five were monitored without intervention (38.9 %).
- Statistically significant differences were observed in tumor size ($P < 0.001$) across treatment groups, as well as in House-Brackman scale grading ($P < 0.001$), CNVII deficit on presentation ($P < 0.001$), other neurologic symptoms on presentation (other than cranial nerves 3,4,5,6,7,8 symptoms) ($P < 0.001$), in tumors 'extension as intracranial, extracranial, or both ($P < 0.001$), and in existing comorbidities ($P = 0.005$).
- SRS achieved 100% local control rate over 19.3 years of follow-up, compared to surgical outcomes showing local tumor control rates of 100%, 97.22%, 88.88%, and 86.11% at 1, 2, 12, and 26 years, respectively, while no significant difference was observed.



- There was a statistically significant difference in CN VII deficit at last follow up ($P = 0.047$), and in initial symptoms resolution ($P = 0.009$).
- Multivariate analysis did not reveal any predictive role of treatment type in local control.
- Only presence of comorbidities predicted lack of recovery from cranial nerve palsy.

CONCLUSIONS

SRS offers outstanding long-term control of facial nerve schwannomas with better outcomes in facial nerve (CN VII) deficits at the final follow-up. These results support SRS as a viable treatment option for FNS, providing effective tumor control with no demonstrated inferiority to surgery as a treatment option.

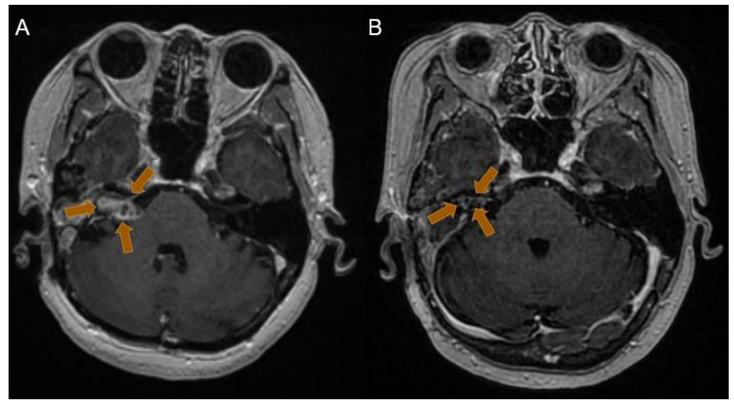


Figure 1. MRI studies of patient #19

A: Pre CyberKnife radiosurgery plan MRI for the right Facial nerve schwannoma. The tumor volume was 2.09 cc. A marginal dose of 18 Gy, with the maximum dose of 22.5 Gy, was delivered in 3 fractions to 80% isodose line (T1-Weighted with Contrast Enhancement).

B: MRI study of 106-month follow-up demonstrates a small residual of the right Facial nerve schwannoma lesion where SRS was delivered (AX Stereo BRAVO), and CN VII symptoms resolution.

Table 3: Neurological findings at presentation

Variable	Value
No. of tumors	90
CN VII deficit	
Yes	54 (60%)
No	36 (40%)
Clinical presentation	
Facial droop, asymmetry, weakness, paralysis	44 (48.9%)
Facial Spasm, twitching	17 (18.9 %)
Taste alteration/deficit	2 (2.2%)
Lagophthalmos, dry eye, corneal abrasion	7 (7.8%)
House-Brackmann scale	
Grade I	35 (38.9%)
Grade II	9 (10%)
Grade III	7 (7.8%)
Grade IV	10 (11.1%)
Grade V	2 (2.2%)
Grade VI	27 (30%)
CN VIII deficit	
Yes	58 (64.4%)
No	32 (35.6%)
CN V deficit	
Yes	12 (13.3%)
No	78 (86.7%)
CN III, CN IV, and CN VI deficits	
Yes	15 (16.7%)
No	75 (83.3%)
Other Neurological deficits	
Yes	15 (16.7%)
No	75 (83.3%)
Genetic mutations (NF2)	
Yes	9 (10.6%)
No	76 (89.4%)