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Video Abstract

Surgical salvage for recurrent vestibular schwannoma after primary stereotactic radiosurgery

José Orlando de Melo Junior[1], Victor H. C. Benalia[2], José Alberto Landeiro[3]

[1]Department of Neurosurgery, Paulo Niemeyer State Brain Institute, Rio de Janeiro, Brazil, [2]Lyerly Neurosurgery, Baptist Neurological Institute, Jacksonville, United States of America, [3]Department of Neurosurgery, Antônio Pedro University Hospital, Niterói, Brazil.

E-mail: *José Orlando de Melo Junior - jomjunior@gmail.com; Victor H C Benalia - victor.benalia@bmcjax.com; José Alberto Landeiro - jalandeiro@gmail.com

***Corresponding author:**
José Orlando de Melo Junior, Department of Neurosurgery, Paulo Niemeyer State Brain Institute, Rio de Janeiro, Brazil.

jomjunior@gmail.com

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ABSTRACT

Background: The management of vestibular schwannoma has evolved over the past hundred years. In the last decades, surgery has been gradually replaced by radiation therapy as a primary treatment modality, particularly for small tumors, due to the less invasive nature and the compared reported outcomes in tumor control and hearing preservation. However, irradiation sometimes fails to stop tumor growth. In a long-term follow-up after primary fractionated stereotactic radiotherapy, the rate of treatment failure was reported as 3% and needed surgical salvage. For single-fraction modality, Hasegawa *et al.* reported salvage treatment after primary Gamma Knife radiosurgery in 8%, where 90% of these underwent surgery and 50% of those who were treated with a second gamma knife surgery required surgical intervention later. An increase in tumor volume by more than 10–20%, tumor growth after three years, and no return to pretreatment volume after transient swelling have been considered as tumor recurrence rather than pseudoprogression, a transient increase in tumor volume after radiotherapy that occurs up to 30% of cases. It has been reported that microsurgery after radiotherapy is more difficult, with most authors reporting a loss of defined arachnoid planes and worse cranial nerve outcomes, especially for hearing and facial nerve function.

Case Description: A 43-year-old female patient was incidentally (asymptomatic) diagnosed on a magnetic resonance imaging (MRI) scan harboring a left vestibular schwannoma, grade T2 (Hannover classification), in 2015. Neurologic examination was unremarkable, and audiometry testing was normal. She was initially treated with observation. Three years later, in 2018, the lesion had enlarged, becoming a grade T3a and reaching the cistern of the cerebellopontine angle. The tumor was then treated with fractionated stereotactic radiosurgery (5 sessions of 5 Gy). MRI scans in 2019 and 2020 showed slight tumor growth. This enlargement was attributed to a pseudoprogression after radiosurgery, and only observation was advocated. In 2022, 4 years later, after radiosurgery, the tumor was still growing, and the patient began to suffer from hearing loss. A failure treatment was considered, and microsurgery was indicated. The patient was counseled about the risk of functional nerve impairment, and surgical consent was obtained. A retro sigmoid approach was planned. A gross total resection was attempted due to the clear subperineural plane during tumor dissection and because it was the only option that would provide a cure for the patient. The adjacent neurovascular structures were firmly adhered to the tumor capsule, which represented a major challenge for microdissection. The tumor was soft, without significant bleeding. A total resection was achieved, and the facial nerve was anatomically preserved. The patient developed facial paresis (House-Brackmann III) in the immediate postoperative period, which improved at the 6-month follow-up. Hearing loss did not improve. Postoperative MRI showed total resection.

Conclusion: Microsurgery after radiotherapy for vestibular schwannoma is challenging in terms of indication, when to indicate, resection target, difficulty in dissection due to local changes, and outcome. Gross total resection may be considered, as it is the only treatment that may provide a cure for the patient. However, the patient should be counseled about the risks.

Keywords: Radiosurgery, Radiotherapy, Salvage surgery, Skull base, Vestibular schwannoma

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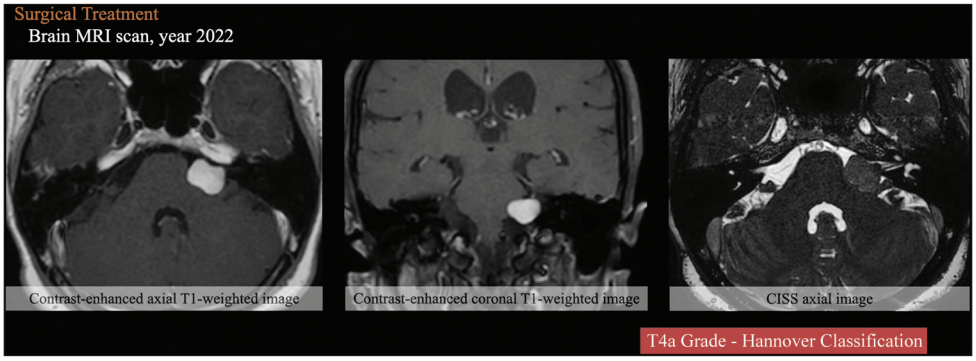

Video 1: Surgical salvage for recurrent vestibular schwannoma after primary stereotactic radiosurgery

[Video 1]-Available on:
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Annotations[1-5]

1. 00:00 – Introduction
2. 00:26 – Case presentation
3. 00:43 – Preoperative imaging
4. 01:54 – Surgical anatomy
5. 01:58 – Retrosigmoid craniotomy
6. 02:36 – Cerebellopontine angle
7. 03:05 – Surgical case
8. 03:07 – Positioning, skin incision, and retrosigmoid craniotomy
9. 03:23 – Microsurgery
10. 05:43 – Postoperative imaging
11. 05:48 – Outcome
12. 06:08 – Brief discussion

Ethical approval

Not applicable.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

REFERENCES

1. Friedman RA, Berliner KI, Bassim M, Ursick J, Slattery WH, Schwartz MS, *et al*. A paradigm shift in salvage surgery for radiated vestibular schwannoma. Otol Neurotol 2011;32:1322-8.
2. Hasegawa T, Kida Y, Kato T, Iizuka H, Kuramitsu S, Yamamoto T. Long-term safety and efficacy of stereotactic radiosurgery for vestibular schwannomas: Evaluation of 440 patients more than 10 years after treatment with Gamma Knife surgery. J Neurosurg 2013;118:557-65.
3. Kapoor S, Batra S, Carson K, Shuck J, Kharkar S, Gandhi R, *et al*. Long-term outcomes of vestibular schwannomas treated with fractionated stereotactic radiotheraphy: An institutional experience. Int J Radiat Oncol Biol Phys 2011;81:647-53.
4. Rueß D, Schütz B, Celik E, Baues C, Jünger ST, Neuschmelting V, *et al*. Pseudoprogression of vestibular schwannoma after stereotactic radiosurgery with cyberknife®: Proposal for new response criteria. Cancers (Basel) 2023;15:1496.
5. Starnoni D, Giammattei L, Cossu G, Link MJ, Roche PH, Chacko AG, *et al*. Surgical management for large vestibular schwannomas: A systematic review, meta-analysis, and consensus statement on behalf of the EANS skull base section. Acta Neurochir (Wien) 2020;162:2595-617.

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