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MRI Changes in Failed Radiosurgery for Vestibular Schwannomas

Subject Area:  [Neurology and Neuroscience](#),  [Surgery](#)

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Abstract

Introduction: Radiosurgery is now a recognized treatment of vestibular schwannoma (VS); however, radiosurgical irradiation sometimes fails to stop tumor growth in the long term. Some changes in MR imaging after radiosurgery that are supposed to be related to permanent tumor control may be observed in patients with failed treatment. The objective of the present study was to evaluate the MRI changes observed early after radiosurgery in a cohort of patients with failed radiosurgery for VS. **Methods:** From a large series of VS treated radiosurgically for 15 years, we reviewed the follow-up MRI data in a subgroup of VS that presented obvious treatment failure. T1-weighted MR imaging with standard timing of gadolinium injection was applied for image acquisition during the radiosurgical procedure and all follow-up MR imaging. Evolution of tumor volume and contrast enhancement were assessed on 3D-co-registered MRI. **Results:** Twenty-nine of 728 patients (4%) were retreated for the same VS after >2 years (median 3.14 years, range 2.04–9.47) following initial radiosurgical treatment. The median tumor volume was 0.94 cc at first radiosurgical treatment and 2.19 cc at retreatment. Fourteen patients (48.3%) had continuous increase in tumor volume. For 10 patients (34.5%), the tumor volume reduced significantly after irradiation before it increased again. Four patients (13.8%) showed a transient increase in tumor volume after irradiation, followed by significant volume reduction, then a very significant tumor regrowth. A significant loss of contrast enhancement at the center of the tumor was observed for 25 patients (86.2%); full recovery of contrast enhancement of the tumor was observed for 23 patients. **Discussion/Conclusion:** Tumor volume reduction and central loss of contrast enhancement of the tumor are MRI changes frequently observed during follow-up of VS treated radiosurgically even in patients with failed long-term tumor control and may therefore not be considered as signs of successful response of the tumor to the radiosurgical treatment.

Keywords: [Gamma knife radiosurgery](#), [Vestibular schwannoma](#), [Imaging changes](#), [Tumor volume](#), [Contrast enhancement](#)