



## Delayed Post-Radiosurgery Hemorrhage in Vestibular Schwannomas Associated with Anticoagulation Therapy

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**Objectives:** Discussion and report of two rare cases of vestibular schwannoma (VS) with delayed intratumoral bleeding as a delayed complication of Gamma Knife Radiosurgery associated with the use of anticoagulation therapy.

**Methods:** Retrospective review of 2 vestibular schwannoma cases presented with intratumoral hemorrhage after radiosurgical treatment, their clinical progression and imaging follow-up.

### Results:

#### Case 1:

A 78-year-old woman presented with right facial pain and ipsilateral hipoacusia. MRI showed a right VS with compression of the trigeminal nerve and underwent GKRS with 11 Gy at 50% isodose line for the tumor and point dose of 60Gy to the trigeminal nerve. Patient presented initial tumor and pain response. After 51 months of the treatment, she developed progressive headache, worsening facial pain and numbness. At physical examination, she presented with ataxic gait and compromised balance, nystagmus at right lateral gaze, anacusia. During this time, she had started factor Xa inhibitor (10mg/day) due to coronary stent. There was no history of trauma. Head-CT identified important tumoral volume increase with intratumoral hemorrhage, without acute hydrocephalus, and no significant mass effect. It was decided for a non-surgical management and Eliquis was discontinued after consultation with primary care provider. Control head-CT, after 2 weeks, evidenced decrease hemorrhage and no volume change. After 6 months of the bleeding, the patient had gait improvement and eventual periorbital spasm suggesting a new VII CN involvement.

#### Case 2:

A 53year-old male with facial palsy, anacusia and mild ataxia had MRI evidence of right VS. He was submitted to partial surgical resection and presented tumor recurrence after 11 years. He underwent GKRS with 13 Gy at the 46% isodose line with decrease in tumor volume but without clinical change. At the 23rd month post-GKRS, he presented right throbbing supraorbital headache controlled with opioids and right-sided motor facial spasm. There was no history of trauma but the patient was on antiarrhythmics and aspirin (81mg/day) due to atrial fibrillation. MRI noticed an intratumoral hemorrhage at the extracanalicular segment. Tumor was managed conservatively. Subsequent scans showed hemosiderin deposition and no volumetric change neither of the hemorrhage, nor the tumor and the symptoms abated.



**Conclusion(s):** VS hemorrhage has been described as a rare delayed complication with anticoagulation therapy being associated with a 25-fold increase risk. Our two patients had initial response to treatment with decrease in tumor volume with delayed intratumoral bleeding after 23 and 51 months of the GKRS. Both patients were in use of anticoagulation (aspirin and factor Xa inhibitor) at the time of the hemorrhage but not at the time of the treatment. The symptoms presented were headache and association of another cranial nerve dysfunction (facial and trigeminal). The symptomatic presentation can be explained not only by the rapid volume increase and compression but also by local inflammatory response. As the hematoma is absorbed it is expected a volumetric and inflammatory decreases, with symptomatic improvement. Continuation of the anticoagulation should be reviewed individually with the primary care.

