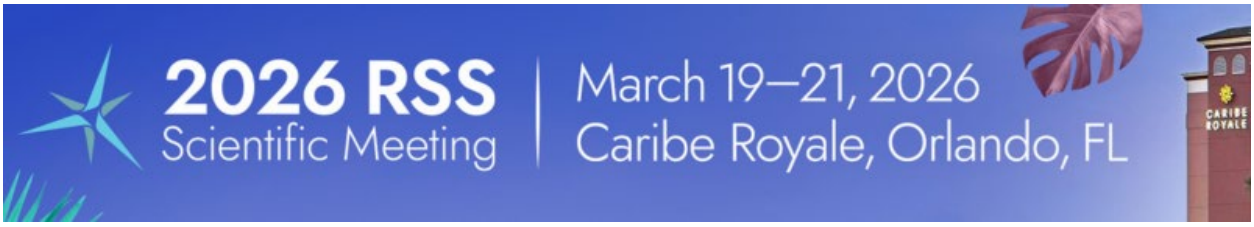


## Initial Experience with Gyroscopic Radiosurgery for Acoustic Neuroma

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**Objectives:** ZAP-X is the newest cranial stereotactic radiosurgery (SRS) platform. There are few reports describing its use or outcomes for acoustic neuroma (AN). In this study, dosimetric parameters and initial clinical outcomes are presented for ZAP-X AN SRS.

**Methods:** 16 patients were treated with ZAP-X AN SRS. All patients underwent high-resolution posterior fossa imaging with magnetic resonance imaging (MRI), detailed neurological examination, and audiologic testing that included speech discrimination score and pure-tone average before treatment and during follow-up. Neurological symptoms included 13 patients (81.5%) with hearing loss, 6 patients (37.5%) with headache, 6 patients (37.5%) with imbalance/ataxia, 3 patients (18.8%) with tinnitus, 2 patients (12.5%) with vertigo, 2 patients (12.5%) with facial weakness, 2 patients (12.5%) with cognitive impairment, 1 patient (6.3%) with trigeminal neuralgia, 1 patient (6.3%) with neck pain, and 1 patient (6.3%) with visual field defect. Comorbidities included 2 patients (12.5%) with meningioma, 1 patient (6.3%) with history of prostate cancer and metastatic neuroendocrine carcinoma, and 1 patient (6.3%) with Ménière's disease. 1 patient had two prior AN resections. The Koos classification was used to assess the relationship between the tumor and surrounding structures: 1 patient was Koos class 1 (6.3%), 4 patients class 2 (25%), 4 patients class 3 (25%), and 7 patients class 4 (43.8%). Hearing was categorized according to the Gardner-Robertson (GR) hearing classification: 3 patients were GR class 1 (18.8%), 9 patients class 2 (56.3%), 3 patients class 3 (18.8%), and 1 patient class 4 (6.3%). Average patient age was 61 ± 18 years with 9 males (56.3%) and 7 females (43.8%). Average prescription dose was 19 ± 5 Gy (range: 13 – 30 Gy), average target volume was 3 ± 2 cc (0.12 – 8.33 cc), average number of fractions was 2.9 ± 1.4 (1 – 5), average number of isocenters was 8 ± 4 (1 – 16), average number of beams was 160 ± 50 (68 – 233), average conformity index was 1.23 ± 0.19 (1.062 – 1.855), average gradient index was 3.02 ± 0.37 (2.537 – 3.763), average Ipsilateral Cochlea D0.035cc was 800 ± 400 cGy (107.06 – 1374.73 cGy), and average treatment time was 48 ± 17 minutes/fraction (12 – 84 minutes/fraction). Follow-up was scheduled at approximately 3-month intervals post-treatment. Median follow-up was 11 months (IQR: 4.67 – 16.07 months). Maximum diameter method was used to determine tumor control. Disappearance of AN was categorized as complete response, partial response by 30% decrease in the maximum diameter, and progressive disease by 20% increase in the maximum diameter. Average maximum tumor diameter before SRS was 2.2 ± 0.6 cm (1.44 – 3.48 cm).

**Results:** Progression free survival after ZAP-X AN SRS was 100% at 2 years, 3 targets (18.8%) were classified as partial response and 13 (81.3%) as stable. Hearing preservation was 100% at 2 years. Number of neurological symptoms decreased significantly after ZAP-X AN SRS (P = 0.0066). Maximum tumor diameter decreased significantly after ZAP-X AN SRS (average = 1.9 ± 0.5 cm, P = 0.0018). 1 patient developed tinnitus after SRS.

**Conclusion(s):** The ZAP-X platform demonstrates favorable dosimetric performance and initial outcomes and control rates similar to those reported in the literature for AN SRS. Longer follow-up is needed to determine ZAP-X AN SRS efficacy.