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Abstract

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Comparative Analysis of Efficacy and Toxicity Following Single-Fraction versus Five-Fraction Stereotactic Radiosurgery for Vestibular Schwannoma

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Abstract

Objectives:

We performed a comparative analysis of clinical outcomes following single-fraction stereotactic radiosurgery (SRS) versus five-fraction stereotactic radiosurgery (FSRS) for vestibular schwannoma.

Methods:

A retrospective chart review was conducted of 116 patients who underwent LINAC-based image-guided SRS (n=65) or FSRS (n=51) for vestibular schwannoma within an integrated health care system between February 2008 and December 2021. Median SRS prescription dose was 1200cGy (range: 1200-1300cGy), and FSRS prescription dose was 2500cGy in 500cGy fractions. Local failure was defined as a 20% or greater increase in the longest diameter, consecutive increases in size, or requirement of a salvage surgery. Pseudoprogression was defined as an initial increase in size with subsequent decrease in size or stabilization. Cochlear dosimetry data was available for 67% of patients. Pre/post-treatment Gardner Robertson Hearing Scale scores were available for 91%/57% of patients. Local control (LC) and overall survival (OS) were estimated by the Kaplan-Meier method. T-test and Fisher's exact test were used to compare groups.

Results:

Median follow-up was 7.8 years (range: 1.2-15.5). Median patient age was 67 years (range: 22-89). Tumors treated with FSRS were larger than those treated with SRS (median volume: 3.63cc v. 0.74cc, p< 0.001), and 35% of patients had serviceable hearing prior to treatment. Ten-year LC and OS were 91% and 82%, respectively. Ten-year LC was 95% v. 85% (p=0.10) for patients receiving SRS and FSRS, respectively. Pseudoprogression was observed in 34% of cases and comparable between treatment groups, 31% v. 39% (p=0.90) for SRS and FSRS, respectively. Among patients with pre-treatment serviceable hearing, patients who underwent FSRS were more likely to have lost serviceable hearing post-treatment (100% v. 42%, p=0.002). In the SRS group, patients who lost serviceable hearing trended toward higher mean cochlea dose (mean: 591cGy v. 396cGy, p=0.053), and max cochlea dose (mean: 1033cGy v. 733cGy, p=0.06). Radiotherapy-related facial nerve palsy was noted in 3.1% v. 2.0% (p=0.14) of cases, and treatment-related trigeminal nerve dysfunction was observed in 3.1% v. 9.8% (p=0.13) of patients in the SRS and FSRS groups, respectively.

Conclusion(s):

Local control is comparable between SRS and FSRS for vestibular schwannoma. Patients who were treated with FSRS had larger tumors and were more likely to experience loss of serviceable hearing post-treatment. Rates of pseudoprogression and cranial neuropathies were similar between groups.