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Abstract

Longitudinal Radiographic Outcomes of Vestibular Schwannoma in Single and Fractionated Stereotactic Radiosurgery

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Abstract

Objective(s): Management of vestibular schwannoma (VS) includes stereotactic radiosurgery (SRS) in single or fractionated treatments. There is a paucity of literature on the 3D volumetric kinetics and radiologic changes following SRS and no consensus on appropriate post-SRS surveillance imaging timeline.

Methods: This is a retrospective cohort study with IRB approval. A total of 55 patients met study criteria. Our study is first to collect 3D volumetric kinetics of VS following single and fractionated SRS in contrast to extrapolations from single and 2D measurements. We collected volumetric kinetic data in VS treated with SRS over time using a target volume contouring software. We also tracked radiographic phenomenon such as pseudoprogression and necrosis. A secondary objective was to describe our overall treatment success rate and to describe any failures.

Results: For all treatments groups, pseudoprogression most typically occurred within 12 months post-SRS, after which tumor volumes on average normalized and then decreased from pre-treatment size at last follow-up. Only two patients required salvage therapy post-SRS and were considered SRS treatment failures. Both patients were in the five-fraction cohort but with a lower biologically equivalent dose. Our longitudinal data also shows initial increases in volume in the first 12 months post-SRS followed by later declines. There were low rates of treatment failure (3.6%) and these occurred only with SRS dose de-escalation.

Conclusion(s): This is the first study to collect 3D volumetric kinetics of VS following single and fractionated SRS in contrast to extrapolations from single and 2D measurements. We show that volumes of VS increase in the first 12 months post-SRS and then later decline, setting up an interesting questions regarding the utility of early post treatment surveillance imaging in the asymptomatic patient. Finally, we show low rates of treatment failure (3.6%) and show in our cohort that SRS dose de-escalation posed a risk for treatment failure.

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