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Radiotherapy for vestibular schwannomas: A critical review

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Vestibular schwannomas are slow-growing tumors of the myelin-forming cells that cover cranial nerve VIII. The treatment options for patients with vestibular schwannoma include active observation, surgical management, and radiotherapy. However, the optimal treatment choice remains controversial. We have reviewed the available data and summarized the radiotherapeutic options, including single-session stereotactic radiosurgery, fractionated conventional radiotherapy, fractionated stereotactic radiotherapy, and proton beam therapy. The comparisons of the various radiotherapy modalities have been based on single-institution experiences, which have shown excellent tumor control rates of 91-100%. Both stereotactic radiosurgery and fractionated stereotactic radiotherapy have successfully improved cranial nerve V and VII preservation to >95%. The mixed data regarding the ideal hearing preservation therapy, inherent biases in patient selection, and differences in outcome analysis have made the comparison across radiotherapeutic modalities difficult. Early experience using proton therapy for vestibular schwannoma treatment demonstrated local control rates of 84-100% but disappointing hearing preservation rates of 33-42%. Efforts to improve radiotherapy delivery will focus on refined dosimetry with the goal of reducing the dose to the critical structures. As future randomized trials are unlikely, we suggest regimented pre- and post-treatment assessments, including validated evaluations of cranial nerves V, VII, and VIII, and quality of life assessments with long-term prospective follow-up. The results from such trials will enhance the understanding of therapy outcomes and improve our ability to inform patients.

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