

## Long-Term Management Outcomes of Hypoglossal Schwannomas: A Comprehensive Single-Institution Experience and Literature Review

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**Abstract**

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### Abstract

**Objectives:**

Hypoglossal schwannomas (HS) are rare benign tumors stemming from the Schwann cells of the twelfth cranial nerve. Historically, surgery has been the preferred treatment option, but stereotactic radiosurgery (SRS) is emerging as an alternative. This study evaluates the efficacy and safety of SRS in managing HS compared to surgical resection and observation.

**Methods:**

We performed a retrospective analysis of patients with HS at our institution between 1999 and 2024. Demographic, clinicopathologic, radiologic and treatment data were collected. Statistical analyses included Fisher's Exact test and ANOVA. Outcomes included local tumor control (LTC), progression free survival (PFS), overall survival (OS), post-management adverse events, symptom resolution, and hypoglossal nerve deficits. A literature review was conducted following PRISMA guidelines.

**Results:**

We analyzed 20 tumors in 16 patients. Ten tumors were treated with SRS (50%), seven with surgical resection (35%), and three were monitored without intervention (15%). SRS demonstrated superior outcomes in local tumor control ( $p = 0.001$ ), symptom resolution ( $p = 0.015$ ), PFS ( $p = 0.032$ ), and fewer hypoglossal nerve deficits at last follow-up ( $p = 0.028$ ). The surgical resection group (SR) exhibited higher adverse events ( $p = 0.002$ ). SRS achieved 100% local control over 5-17 years of follow-up, compared to surgery with local control rates of 85.71%, 71.42%, and 57.14% at 2, 6, and 10 years, respectively.

**Conclusion(s):**

SRS provides excellent long-term control of hypoglossal schwannomas, with superior symptom resolution and minimal recurrence. These findings support SRS as a primary treatment modality for HS, offering effective tumor management with fewer adverse effects compared to surgery.