Patterns of Continuous Volume Reduction following Facial Nerve Preserving Subtotal Resection for Vestibular Schwannoma Tumors

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Disclosures

• Nothing to disclose
INTRODUCTION

• Subtotal resection (STR) of vestibular schwannoma (VS) tumors remains controversial and little is known about the initial post-operative change in size. We believe that VS tumors managed with facial nerve preserving STR will have significant continued volume reduction well beyond the initial post-operative period.
METHODS

• The authors retrospectively reviewed the medical records of patients between January 2002 to January 2017 who had undergone primary microsurgical resection of VS at a single institution, by a single neurosurgeon and neurotologist. We calculated slope estimates for our patient cohort to find the overall change over time using a linear regression fit. Volumetric data was assessed using Osirix. The primary outcome was tumor volume at each stage of radiographic follow-up.
RESULTS

- The records of 38 patients with microsurgical resection of VS were reviewed. Six of these patients had gross total resection and were excluded. Of the 32 patients with facial nerve preserving subtotal resection, 12 had adequate radiographic follow-up to be included in our analysis. The mean (SD) patient age was 58.3 (18.6). The mean (SD) pre-operative tumor diameter and volume was 3.9cm (1.3) and 15.7cm³ (12.4). There was a mean (SD) pre-operative House-Brackmann (HB) score of 1.2 (0.6), and a mean (SD) post-operative HB score of 1.7 (1.2), which reduced to a mean (SD) of 1.5 (1.0) by 1 year. For the first 3 post-operative years, the mean rate of volume reduction was -17% per year with a range of 5%-67%.
RESULTS, cont

• There was a trend towards significant reduction in volume of VS tumors at 1 year (p=0.10), 2 years (p=0.08), and 3 years (p=0.22). The mean slope estimate in volume reduction over time was −1.01 unit per year (p=0.08). The mean post-operative reduction in tumor volume was 85%, increasing to 87% by 1-year, 90% by 2-years, and 93% by 3-years. From the immediate post-operative period to the 3-year follow up, there was a 51% mean reduction in tumor volume. For cystic tumors, there was a 43% shrinkage in volume at 1-year the compared with an 11% reduction in volume at 1-year for the non-cystic tumors.
Figure 1. Graph outlining volume reduction over 5 years with % of tumor volume change (x) plotted against time (y). The 100% value indicates the 3-month post-operative volume. One tumor began to show growth at 4.4 years post-operatively, but this was after a 64% reduction in the post-operative volume.
Figure 2. Post-contract T1 magnetic resonance imaging (MRI) displaying vestibular schwannoma tumor with the white arrow highlighting the tumor. The upper right corner displays a 3D rendering of the tumor. 3D renderings are not to scale. A. Pre-operative MRI imaging displaying a 20.1cm$^3$ tumor. B. Follow up imaging at 3 months post-op displaying a tumor with a volume of 2.8cm$^3$ (86% extent of resection). C. Follow up imaging at 28 months post-op displaying a tumor with a volume of 1.9cm$^3$. D. Follow up imaging at 52 months post-op displaying a tumor with a volume of 1.0cm$^3$. 
CONCLUSIONS

• Most VS tumors with STR will continue to reduce in size well beyond their initial 3-month post-operative imaging follow up. For this reason, we advocate a “watch and wait” strategy after subtotal resection of VS tumors. It may be optimal to wait to offer post-operative radiosurgery after these tumors have reduced in size, to limit the field of radiation. Size reduction is greatest at 2 years and then begins to slow down.
REFERENCES


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