Location of Small Intracanicular Vestibular Schwanommas Based on Magnetic Resonance Imaging

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ABSTRACT

Introduction: The origin of vestibular schwannomas (VS) has long been debated. Historically, VS had been thought to arise from the glial-Schwann cell junction. Recently, otopathology studies indicate that VS may arise anywhere along the course of the vestibular nerve. These studies, however, have largely analyzed tumors of all sizes, which may confound findings. Herein, we aim to quantify position of small intracanalicular VS to gain possible understanding of the biology of VS formation.

Methodology: Patients with VS at our institution were reviewed. Included patients had available magnetic resonance imaging (MRI) studies and tumor size ≤ 5mm. Patients previously treated with surgery or radiation were excluded. Using a modified classification by Merchant et al., the length of the IAC was divided into thirds and the segment containing the VS was determined.

Findings: 298 tumors were identified with an average patient age of 59 years. Tumors smaller than 5mm accounted for 12.8% (38/298) of patients. The average age of patients with small tumors were 62 years. Of small tumors, 45% of tumors were close to the fundus, 16% were along the midpoint of the IAC, and 2% were close to the porus. Tumors that spanned more than one segment were predominantly closer to the fundus (34%) than to the porus (3%)

Conclusion: Data suggest that small tumors may frequently occur near the fundus of the IAC, or that lateral small tumors present with earlier symptoms. Larger intracanalicular tumors may occur through lateral to medial growth. Findings have implications for the pathogenesis of VS and efforts at hearing preservation treatment approaches.

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INTRODUCTION

- Vestibular schwannomas (VS) had been theorized to arise from the glial-Schwann cell junction
- Recent otopathology studies indicate that VS may arise anywhere along the course of the vestibular nerve.
- These studies, however, have largely analyzed tumors of all sizes, which may confound findings.

HYPOTHESIS

- We hypothesize that tumors may arise along the course of the vestibular nerve

AIMS

- We aim to quantify position of small intracanalicular VS

METHODOLOGY

- Patients with VS at our institution were reviewed.
- Inclusion criteria were available magnetic resonance imaging (MRI) studies and tumor size ≤ 5mm.
- Exclusion criteria were previously treated with surgery or radiation were excluded
- Using a modified classification by Merchant et al., the length of the IAC was divided into thirds and the segment containing the VS was determined

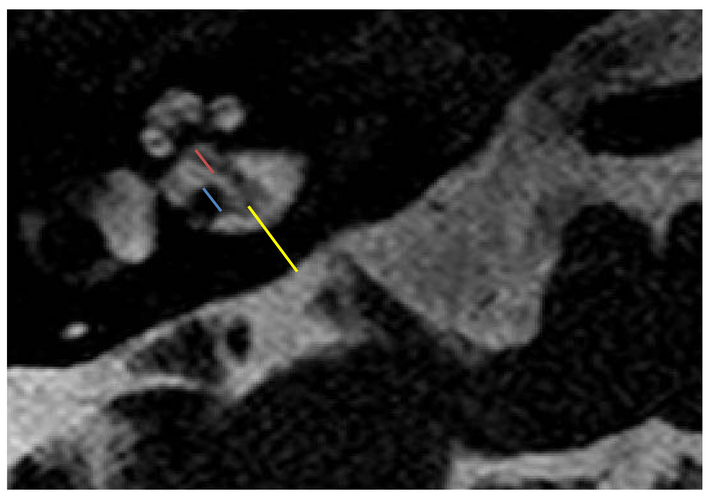

Figure 1: Quantification of VS along IAC. Axial cut, magnetic resonance imaging, DRIVE sequence. Red line represents distance to fundus. Blue line represents size of tumor. Yellow line represents distance of tumor to porus.

RESULTS

- From 1999 to 2016, n=298 tumors were identified
- Average patient age of 59 years old, 58.7% were women, and 48.7 were left ears
- Tumors smaller than 5mm accounted for 12.8% (38/298) of patients. (Figure 2)

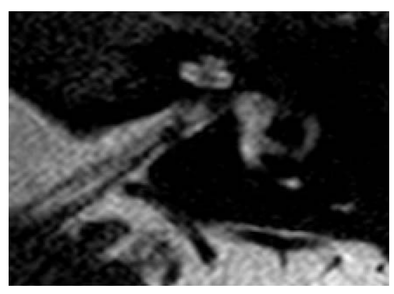

Figure 2: Representative image. Axial cut, magnetic resonance imaging, DRIVE sequence.

- The average age of patients with small tumors were 62 years old
- Of small tumors, 61% of tumors were close to the fundus, 29% were along the midpoint of the IAC(Figure 3)
- 5% of VS were close to the porus and 5% were between fundus and midpoint. (Figure 3)

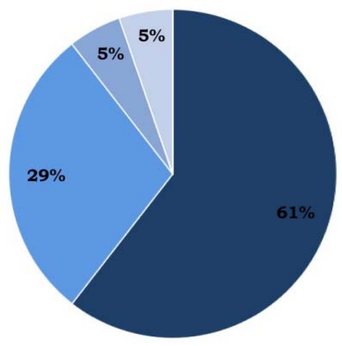

Figure 3: Distribution of VS position. The majority of small tumors were near the fundus.

DISCUSSION

- Small tumors frequently occur near the fundus of the IAC
- Lateral small tumors may present with earlier symptoms
- Findings have implications for the pathogenesis of VS and efforts at hearing preservation treatment approaches

REFERENCES

- Roosli et al. Audiology & Neurotology, 2012.
- Xenellis et al. Otology & Neurotology, 2003.
- Sterkers, et al. JM, *Acta Otolaryngol* 1987.
- Neely, JG, et al. *Laryngoscope,* 1976.