Tinnitus Following Treatment for Sporadic Acoustic Neuroma

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INTRODUCTION

Tinnitus is awareness of an auditory percept in the absence of corresponding stimulus. The onset of tinnitus may be abrupt or progressive with an overall prevalence in the adult population of between 10-15%. This prevalence increases to 74% in patients with acoustic neuromas, where tinnitus is second only to unilateral deafness as the most common presenting symptom. More than simply a cardinal symptom in acoustic neuromas, tinnitus has a significant impact on patient quality of life 1-3, that is often underappreciated. Prior studies have addressed how acoustic neuroma resection impacts tinnitus perception 4-6, but reports are largely limited to description of factors that contribute to persistence or worsening of tinnitus following tumor treatment.

Assessment of tinnitus using a clinically validated instrument is necessary to accurately quantify tinnitus severity. One such tool is the Tinnitus Functional Index (TFI), a statistically validated survey instrument designed to measure change following intervention 15. A systematic review identified no other tinnitus evaluative instruments with rigorous validity, reliability, and responsiveness, where only TFI measures tinnitus impact with 8 subscales 14. To date, there are no reports using TFI to evaluate tinnitus in patients following treatment for acoustic neuroma.

The Acoustic Neuroma Association conducted a survey in 2012 of its membership to provide patients and families with a framework for expectations regarding the symptoms, diagnosis, treatment, and post-treatment issues 15. Their vast membership provides ready access to a population of patients with acoustic neuromas that emulates multi-institutional sampling, allowing for broad generalizability of results. As such, we developed an online survey targeting sporadic acoustic neuroma to gather a cross-sectional time-series perspective on tinnitus-related distress by deploying the TFI questionnaire. This information will be valuable for counseling patients, providing further validation of the TFI, and anchoring expectations of treatment choices.

METHODS

A cross-sectional descriptive study was developed in accordance with institutional review board approved procedures. Invitation to participate in the study was exhibited on the Acoustic Neuroma Association (ANA) website. The online Qualtrics survey included 44 questions to capture clinical data on age at diagnosis, at treatment, and at completion of survey, gender, ethnicity, treatment modality, tumor size and laterality, hearing function, tinnitus, and the TFI. Captured information was de-identified. Tinnitus distress was evaluated using the validated 25-item TFI instrument 13.

RESULTS

FIGURE 1: Respondent accrual

Survey started (n = 201)
Unique surveys entries (n = 188)
Duplicate IP, repeated surveys (n = 13)
Unique surveys completed (n = 154)
Incomplete surveys (n = 34)
Eligible participants (n = 143)

FIGURE 2: Overall TFI score

TFI 0 - 100

0 20 40 60 80 100

< 1 1 - 2 2 - 5 > 5 Years since treatment

FIGURE 3: TFI invariant to post-treatment time

TABLE: Demographics

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DISCUSSION

Our current study uses a validated survey instrument, the TFI, to comprehensively evaluate the impact of tinnitus on the quality of life of patients with sporadic acoustic neuromas. Prior studies have evaluated the importance of tinnitus as a side effect of acoustic neuroma surgery 7-9, but no study to date has utilized the recently developed and validated TFI instrument to perform fine resolution analysis of demographic, tumor, and intervention factors that may impact tinnitus-related distress in acoustic neuroma patients.

Our study reveals that tinnitus severity is unrelated to age, sex, tumor size, tumor laterality, residual hearing, or management approach. These findings confirm prior studies that in aggregate, suggest tinnitus is independent of most common variables, thus contributing to its elusive pathophysiology 8, 9, 15, 16. Previous reports have detailed numerous pathways for peripheral dysfunction that contribute to the development or exacerbation of tinnitus 17, however, the lack of correlative variables linked to tinnitus severity suggests that chronic tinnitus in acoustic neuroma patients may be centralized, similar to chronic pain 18. Thus, chronic tinnitus appears to be independent of most identifiable clinical factors and patient counseling will need to discuss the limitations in our current management options to substantially improve tinnitus with any form of intervention.

Approximately 74% of respondents reported preoperative tinnitus, similar in frequency to a number of published studies 9, 12, 15. This number increased to 100% of patients reporting tinnitus in the post-treatment setting. These findings again raise the importance of appropriate patient counseling. Our study also highlights the stability of tinnitus symptoms over time and the overall lack of variability in tinnitus distress over time.

Evaluation of TFI subscales revealed that early interventions should target reduction of tinnitus intrusiveness and augmentation of sense of control. Moreover, 27% of respondents reported severe tinnitus as a very big problem, comparable to estimates from previously published case series 11. When analyzing our cohort for patients with TFI > 40, a number previously determined to identify patients needing aggressive therapies or treatment 13. Nearly half (49%; n=70/143) of our respondents would qualify.

In summary, tinnitus is a common symptom in patients with acoustic neuromas, particularly following treatment. No clear associations were identified between individual demographic or tumor characteristics and severity of tinnitus as measured by TFI. Specifically, no treatment modality, including observation alone, appears to preferentially worsen or alleviate pre-treatment tinnitus distress. These findings provide a foundation to guide preoperative counseling during discussions of treatment modality and to focus subsequent tinnitus interventions on therapies that reduce tinnitus intrusiveness and improve an individual’s perceived control over their auditory phantom.

REFERENCES