

## Severity and Treatment of Tinnitus in Acoustic Neuroma

There is a high prevalence of tinnitus in individuals with acoustic neuromas which has been corroborated by the results of a British Acoustic Neuroma Association. In 2014, a study surveying 143 participants was conducted by University of California, San Francisco to address two questions:

1. How bothersome is tinnitus experienced by treated acoustic neuroma patients?
2. Does the choice of treatment, active intervention and observation, impact tinnitus severity?

It queried demographic features, tumor size and sidedness, hearing function in each ear, type of treatment: microsurgery, stereotactic radiosurgery, fractionated therapy, or observation, and elapsed time from treatment. A Tinnitus Functional Index, which is an instrument to assess tinnitus severity. A scale of 0 to 100 point was used as follows:

- a) "not a problem" (0-20),
- b) "small problem" (21-30),
- c) "moderate problem" (31-40),
- d) "big problem" (41-60), and
- e) "very big problem" (61-100).

### Results

Tinnitus severity following treatment for acoustic neuroma was found to be independent of treatment type, tumor size, tumor sidedness, time after treatment, age, and gender. Tinnitus severity was "not a problem" in 20% of respondents, a "small problem" in 20%, a "moderate problem" in 11%, a "big problem" in 22%, and a "very big problem" in 27%.

Analysis also suggested that individuals with acoustic tumors struggle most with tinnitus intrusiveness and loss of control. The tumor ear was rated deaf to fair in 85% of respondents

The study concludes that choice of treatment, tumor size, age, and gender have little to no bearing on severity of post-treatment tinnitus distress. Tinnitus severity does not differ among the treatment choices of open microsurgery, stereotactic radiosurgery, radiation, and observation.

Acoustic neuroma patients weighing pros and cons of various treatment choices should not use post-treatment tinnitus severity as a factor in decision-making. As nearly half of the respondents have at least a "big problem" with tinnitus, the researchers recommend an integrated acoustic neuroma management strategy that includes proactive tinnitus treatment and hearing rehabilitation of essential deafness in the tumor ear.

### On the Horizon

Acoustic tumor patients with single-sided deafness (SSD) rely on a single ear to capture sound information arriving from all directions.

Recent work in cochlear implantation for the treatment of SSD in the general population points to the promise of a neurostimulation device-based solution. For the majority of acoustic neuroma where the cochlear nerve has been interrupted or severely compromise, cochlear implantation for SSD is not possible because there is no means for electrical pulses to be transmitted to the brainstem.

To overcome this problem, central auditory prostheses that bypass the cochlear nerve are being considered both to improve hearing and to reduce tinnitus. The goal is to restore full hearing capability to the tumor ear and binaural hearing without tinnitus for individuals in patients treated for acoustic neuroma. This innovation is within reach.