Outcomes of Cochlear Implantation on Patients with Long-Standing Single-Sided Deafness

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INTRODUCTION

- There is limited and conflicting literature concerning the efficacy of cochlear implantation (CI) in the case of sensorineural single-sided deafness (SSD) when the duration of deafness (DoD) >10 years
- A shorter duration of bilateral sensorineural deafness is positively correlated with positive hearing outcomes following CI, but the majority of cohorts concerning SSD only include those with DoD <10 years[1]
- Many of the above cohorts show a negative correlation between DoD and the performance of CI in patients with SSD[2]
- While there is evidence that high DoD of SSD leads to reorganization of the brain and the way it processes auditory signals[3], there are also studies that show marked improvement in hearing in patients who had SSD for up to 30 years when paired with extensive training for 12-36 months[4]

HYPOTHESIS/OBJECTIVE

Patients with long duration of deafness (>10 years) can have good language and hearing outcomes with cochlear implantation with the correct counseling and post-operative rehabilitation. The objective of this study is to generate a clinical cohort of patients with SSD with DoD >10 years.

METHODS

- Case series conducted from March 2024 to June 2025 in a tertiary otology practice
- Included adults (18+ years old) who had SSD with pure tone audiometry (PTA) results showing hearing loss (HL) classified as either severe (71-90 dB) or profound (90+ dB) at frequencies between 250-8000 Hz with a DoD >10 years
- After CI, post-operative HL was determined by PTA for frequencies between 250-8000 Hz approximately eight weeks post-CI and compared to pre-operative PTA results
- Patients all participated in self-directed aural rehabilitation at home.

RESULTS

Case	1	2	3	4	5	6	Average
Age (years)	74	48	71	73	75	62	67 ± 9.6
Sex	M	M	F	M	M	M	
Duration of Deafness (years)	60	48	42+	72	15	33+	45 ± 18
Ear with CI	L	R	R	L	L	L	
PTA Performed (weeks post-op)	7.5	7	8	9	5	10	7.8 ± 1.6

TABLE 1: Six patients (5 male, 1 female) underwent unilateral CI (4 left) at an average age of 67 ± 9.6 years with an average DoD of 45 ± 18 years.

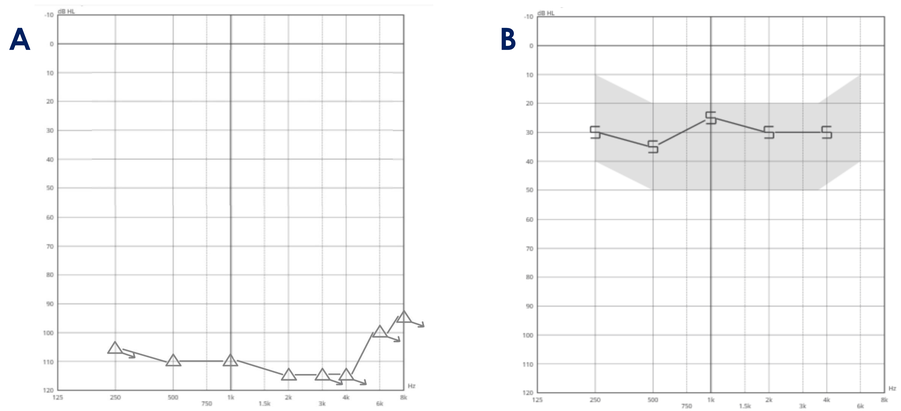


Figure 1: PTA results for Case 1. 7.5 weeks post-CI, there was a 81 dB improvement in average HL. (A) Pre-CI, average HL across frequencies (250-8000 Hz) was 108 dB (95-115 dB). (B) 7.5 weeks post-CI, average HL across frequencies (250-4000 Hz) was 30 dB (25-35 dB).

- Average pre-operative HL was 101 ± 7 dB compared to the average post-operative HL of 32 ± 16 dB performed at an average of 7.8 ± 1.6 weeks post-CI
- Using a Wilcoxon rank test (95% CI), the average improvement in hearing loss was 71 dB (41-83 dB, p = 0.031)

DISCUSSION/CONCLUSIONS

- CI has the potential to be an effective treatment for patients with SSD with a DoD >10 years, but additional research is required to study the viability
- Limitations include degree of variety in demographic factors, single-site data collection, and uncontrolled self-directed aural rehabilitation

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