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# PARENTAL PERCEPTION OF COCHLEAR IMPLANTATION IN CHILDREN WITH SINGLE SIDED-DEAFNESS

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INTRODUCTION: Single-sided deafness (SSD) in children can significantly affect auditory, linguistic, and social development. Cochlear implantation (CI) has emerged as a promising therapeutic option for SSD, but it is still controversial. Obtaining objective outcomes in this population is challenging, therefore benefits perceived by caregivers should also be explored.
OBJECTIVE: Assessing parents' perceptions of CI benefits in children with SSD and identifying its potentially influencing factors.
SETTING: Tertiary pediatric hospital with a reference center for CI.
STUDY DESIGN: Observational, cross-sectional exploratory study.
POPULATION: Twenty-one children with SSD who underwent CI were initially recruited. Four cases were excluded: three due to post-implant follow-up of less than six months, and one due to explantation caused by recurrent swelling over the receiver-stimulator. Thus, the final sample included 17 children.
METHODS: Parents completed age-adapted exploratory questionnaires, based on the Parents' Evaluation of Aural/Oral Performance of Children (PEACH), the Speech, Spatial and Qualities of Hearing Scale for Parents (SSQ-P) and the Pediatric Quality of Life Inventory (PedsQL). For children aged 2 to 4 years, 5 questions from the PEACH and 4 from the PedsQL were selected. For children aged 5 years and older, 12 questions from SSQ-P and 6 from the PedsQL were used. Questions were selected by a panel of experts working with pediatric CI patients and with experience with SSD cases. The questionnaires were administered remotely, and parents were asked to compare their child's hearing quality and impact in quality of life (QoL) before and after CI. Statistical analysis was performed using Python (v3.10). Normalized pre and post-CI scores were compared using Wilcoxon signed-rank tests. Associations between changes in normalized scores and independent variables were assessed using univariable analyses (Spearman correlations, Mann-Whitney U test, or Kruskal-Wallis test, with post hoc analysis when appropriate) and multivariable robust regression (via the *statsmodels* library). Statistical significance was set at $p < 0.05$.
RESULTS: Seventeen children with an average age of 8.1±4.8 years (min = 2.3; max = 18.9) and a median age at CI of 2.6 years (IQR = 4.9; min = 0.9; max = 13.7) were included. Eleven children (64.7%) had congenital SSD, 6 (54.5%) of them due to congenital CMV infection. Of the 6 (35.3%) acquired cases, 4 (66.7%) were due to labyrinthitis/meningitis. Median age at CI for congenital SSD was 1.8 years (IQR = 1.5; min = 0.9; max = 7.2) and for acquired SSD was 8.3 years

(IQR = 7.3; min = 1.4; max = 13.7). Average follow up time was 3.7±1.7 years (min = 0.9; max = 6.1). Data log showed average daily usage of 6.8±3.7 hours (min = 1.6; max = 12), with 8 (53.3%) regular and 7 (46.7%) limited users. Post-implantation pure tone average was 32.8±7.3 dB HL (min = 21; max = 50) and median speech perception at 65 dB HL was 55% (IQR = 77.5; min = 0; max = 100). Parents of 12 children completed the questionnaires. In the younger group, parents reported median hearing quality scores of 18/25 pts pre-CI (IQR = 9; min = 11; max = 22) and 25/25 pts post-CI (IQR = 0; min = 21; max. = 25), and impact in QoL scores of 8/20 pts both pre (IQR = 2; min = 4; max = 12) and post-CI (IQR = 3; min = 4; max = 13). In the older group, parents reported median hearing quality scores of 40/60 pts pre-CI (IQR = 10.5; min = 22; max = 50) and 52/60 pts post-CI (IQR = 7.5; min = 44; max = 58), and impact in QoL scores of 12/30 pts pre-CI (IQR = 7; min = 7; max = 20) and 10/30 pts post-CI (IQR = 4.5; min = 6; max = 17). A significant improvement in parental reported hearing quality post-CI was found (W = 1.0, p = 0.002) (Figure 1), with large effect size (r = 0.86). This improvement was not significantly associated with any factor in univariable analysis. Multivariable analysis (Figure 2) showed that children with acquired SSD due to meningitis/labyrinthitis showed a significantly lower improvement in hearing quality (β = -2.74, p = 0.038), comparing with the congenital CMV group (which had the highest median gain, +1.58). Daily hours of CI usage appeared to associate positively, although this relationship was not significant (β = 0.09; p = 0.536). Other etiologies and direct audio input use did not show any significant association with this outcome. Regarding parental reported impact in QoL, there was a tendency towards post-CI reduction, but this did not reach statistical significance (W = 2.5, p = 0.051, r = 0.57) (Figure 3).

CONCLUSION: Our data suggests parents perceive high hearing quality benefits following CI in SSD. This improvement seems dependent on the type of SSD and etiology in this cohort. Despite detecting a tendency towards reduced impact in QoL following CI, a significant effect was not detected using questions from PedsQL, suggesting this tool may lack sensitivity to the specific challenges faced by children with SSD. Further longitudinal studies and exploration of alternative QoL questionnaires may help clarify the subjective benefits of CI in this population.

*Figure 1: Pre and post-CI normalized parent reported hearing quality scores.*

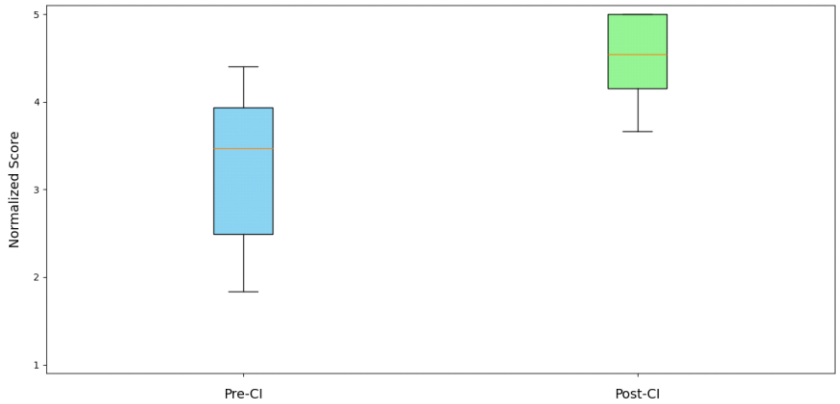


*Figure 2: Pre and post-CI normalized parental reported impact in QoL scores.*

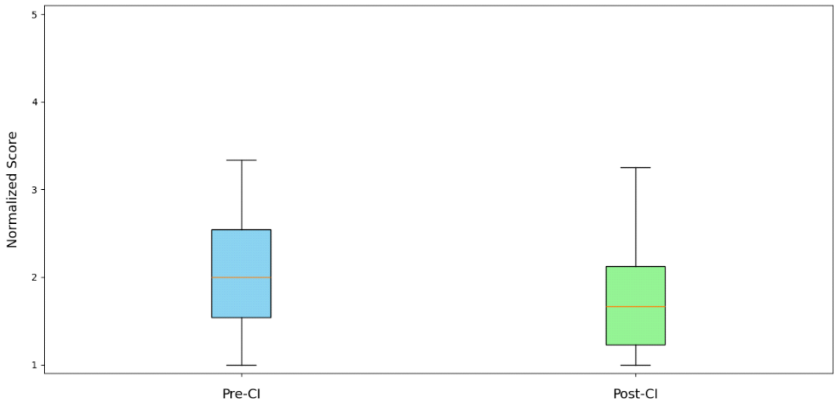


*Figure 3: Multivariable robust regression exploring the influence of different factors in pre and post-CI parental reported hearing quality normalized scores variation*