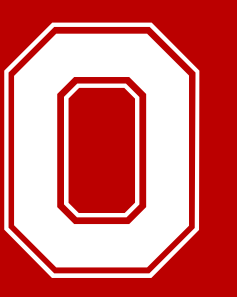


When is Frail too Frail? Examining the Association Between Frailty and Risk of Cochlear Implant Explantation



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Abstract

Objective: To assess the association between medical comorbidities and risk of cochlear implant (CI) explantation/ revision

Study Design: Retrospective matched case-control study

Methods: Patients who underwent cochlear implantation followed by explantation/ revision were age- and gender-matched to those who received CI without explantation. Outcomes included Charlson Comorbidity Index (CCI), presence of medical comorbidities such as cancer and rheumatologic disorders, and history of prior ear surgery.

Results: Twenty-eight patients (16 females, median age 53 years, interquartile range [IQR] 37-67) who underwent CI explantation between August 1997 and January 2023 were matched to 84 CI patients who did not undergo explantation. Calculated mean CCI score was significantly higher in the explant cohort compared to CI cohort (2.5 vs 1.9, $p=0.006$). Examining the most common comorbidities, 3 explant cohort patients and 11 CI cohort patients had cancer (10.7% vs. 13.1%, $p=0.81$), and 3 explant cohort patients and 16 CI cohort patients had rheumatologic diagnoses (10.7% vs. 19.0%, $p=0.12$). Five explant patients and 5 non-explant patients had previous ear surgeries ipsilateral to their CI (17.9% vs. 6.0%, $p=0.03$).

Conclusions: Patients that undergo CI explantation have significantly higher CCI indices than their age- and gender-matched peers, indicating the potential influence of medical frailty on this outcome. Together with the risk of prior ear surgeries, these data inform clinicians on potential factors to consider when assessing a candidate and assist in patient counseling on the risk of this complication after surgery.

Introduction

- Globally over 50 million individuals are affected by severe or profound hearing loss¹
 - Cochlear implantation (CI) is a transformative therapy for these patients
- CI is a safe and reliable surgical intervention²⁻⁵
 - Minor complications include facial nerve stimulation or dizziness
 - Severe complications such as infections, magnet displacement, or meningitis may necessitate device explantation
- Retrospective study of 403 CI patients revealed a 19.9% post-operative complication rate⁶
 - 5% of which were major complications requiring surgical revision or hospital management
- Understanding factors associated with CI explantation and identifying patients at heightened risk of explantation
 - Pivotal for informed discussions between surgeons and patients
- The primary objective of the present study is to assess medical comorbidities and frailty in patients necessitating CI removal

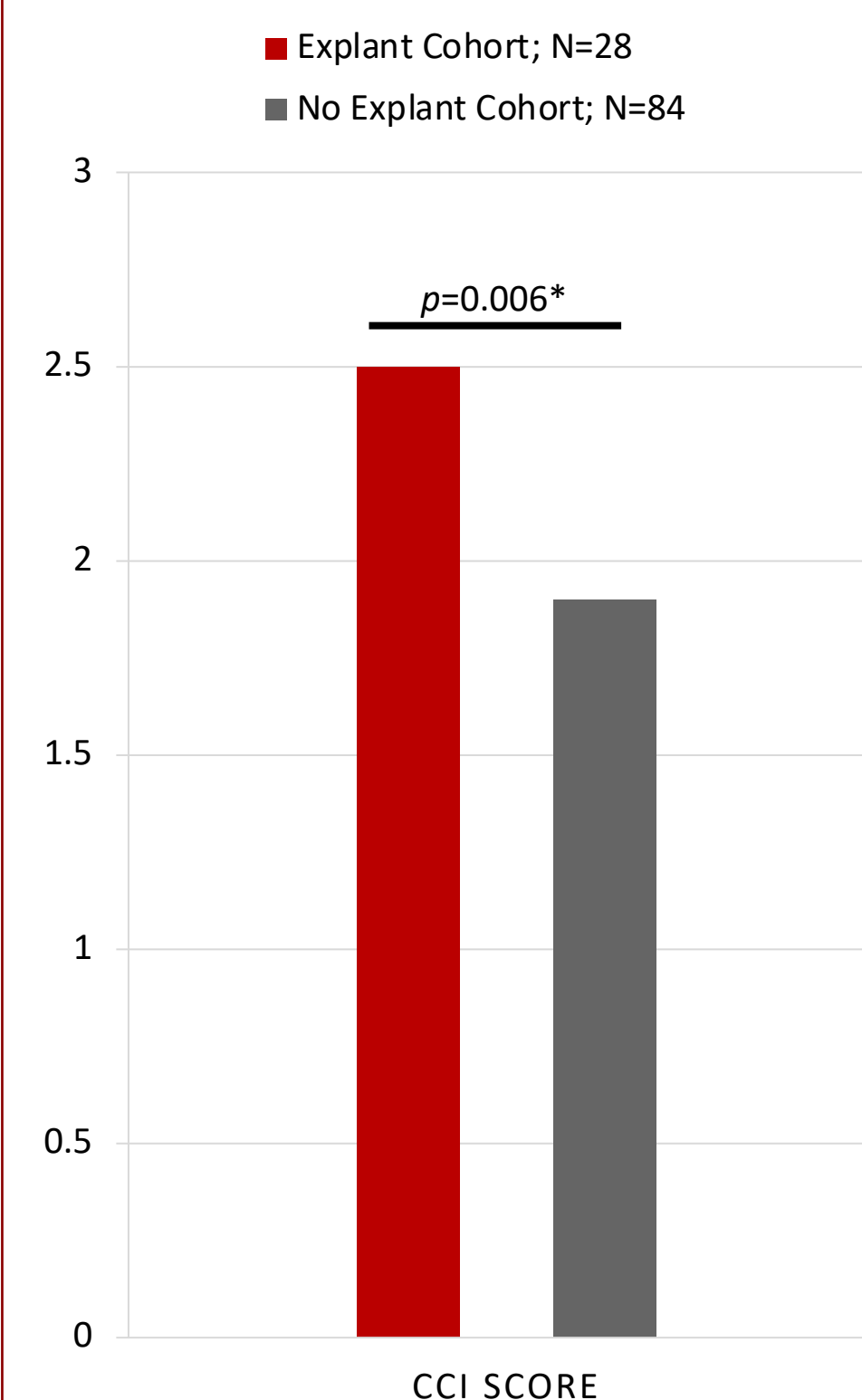
Methods

- Retrospective cohort study of CI recipients at a tertiary academic CI center (Table 1)
 - CI patients between 1997 and 2023
 - Patients who underwent CI explantation were age and gender-matched 1:3 with patients that did not undergo CI explantation
- Patients' medical history was reviewed to assess medical frailty
 - Charlson Comorbidity Index (CCI)
 - CCI is a predictor of 10-year survival
 - Rheumatologic diagnoses, cancer, and previous ear surgery

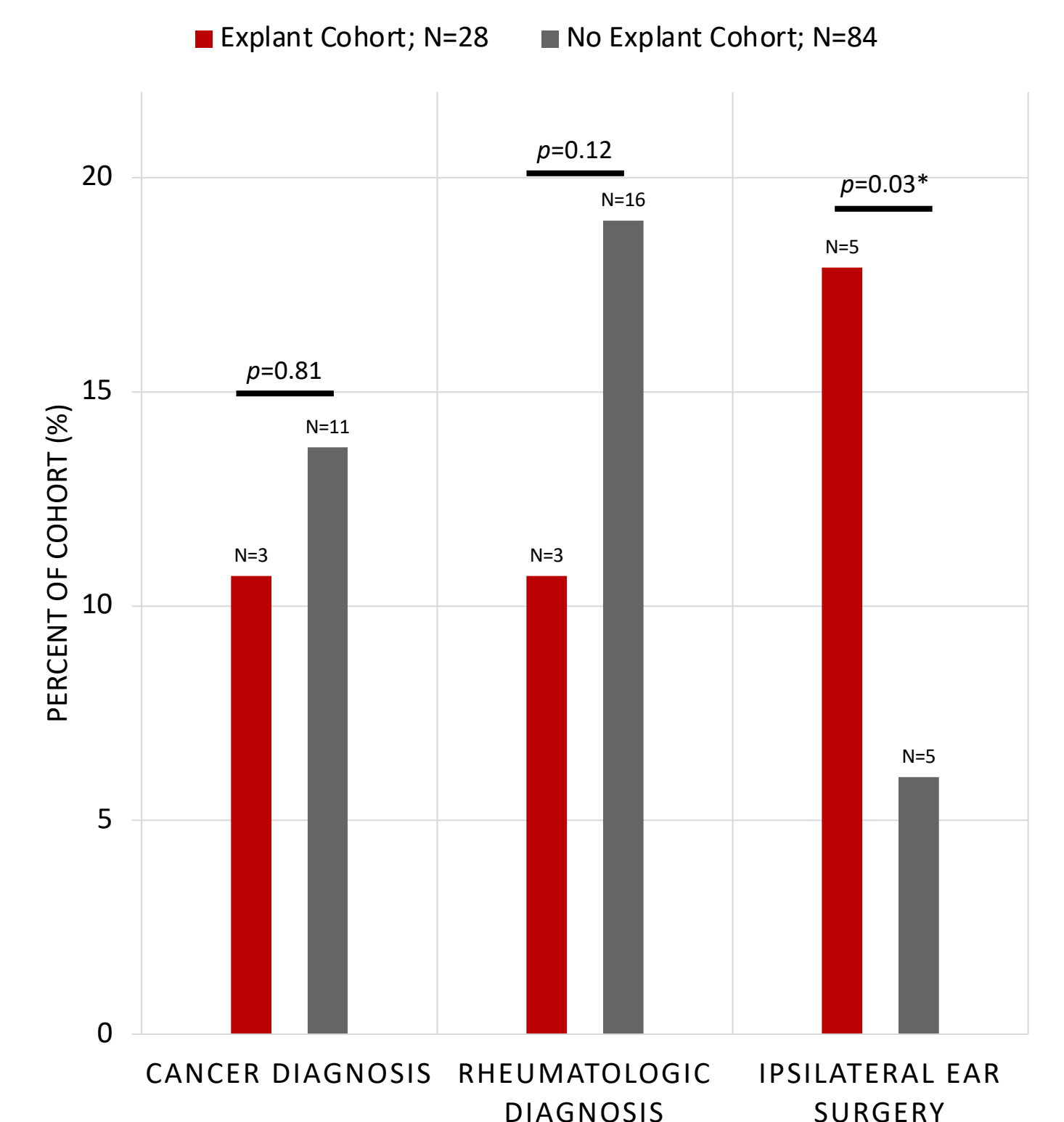
Results

- 28 patients underwent CI explantation during study period
 - Age and gender matched to 84 patients who did not have CI removed
- CCI score was significantly increased in the explant cohort
 - 2.5 compared to 1.9 ($p=0.006^*$)
 - CCI metrics include age, myocardial infarction, congestive heart disease, chronic kidney disease, cerebrovascular accident, COPD, etc.
- Cancer, rheumatologic diagnoses, and prior ear surgeries were frequently noted within the cohorts' medical records and selected as measures of medical frailty

CHARLSON COMORBIDITY INDEX (CCI)



SPECIFIC COMORBIDITIES PREVALENCE



Discussion

- Medical frailty may serve as a potential predictor of CI outcomes and need for device removal
 - CI explant cohort associated with increased CCI score
 - Cancer and rheumatologic diagnoses equally prevalent in the two cohorts
 - History of ipsilateral ear surgery more prevalent in the explant cohort compared to the non-explant cohort
- Future investigations focus on predictors of CI explantation
 - Understanding patient motivations behind implant removal
 - Assessing the prevalence and impact of reimplantation

Conclusions

- Patients who undergo CI explantation exhibit elevated CCI indices compared to no explant cohort
 - Correlation between medical frailty and CI removal.
- Study's findings provide valuable insights for clinicians to consider when evaluating candidates and facilitate informed patient counseling

	Explant Cohort; N=28 (%)	No Explant Cohort; N=84 (%)	CCI points
Female	16 (57%)	49 (58%)	Not Applicable
Age at implant < 50 yrs	13 (46%)	36 (43%)	0
Age at implant 50-59 yrs	4 (14%)	12 (14%)	+1
Age at implant 60-69 yrs	5 (18%)	18 (21%)	+2
Age at implant 70-79 yrs	3 (11%)	9 (11%)	+3
Age at implant ≥ 80 yrs	3 (11%)	9 (11%)	+4

Table 1. Patients demographics. Patients in the explant and no explant cohorts were age and gender matched

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