Cochlear Implantation Outcomes in Patients with Retrocochlear Pathology: A Systematic Review

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Disclosures

• No relevant disclosures
Introduction

Retrocochlear pathology

Cochlear Implantation (CI)
Introduction

Retrocochlear pathology

Cochlear Implantation (CI)

1. Speech understanding
2. Quality of life
To summarize outcomes following cochlear implantation in patients with retrocochlear pathologies

**Study Objective**

To summarize outcomes following cochlear implantation in patients with retrocochlear pathologies

**Primary outcome**

Speech discrimination scores 6 months to 1 year after implantation

**Secondary outcomes**

- CI daily usage
- Rates of tinnitus suppression
- Patient and tumor factors leading to better outcomes in patients with VS
Methods

• A systematic search of databases (PubMed/MEDLINE, Embase and Cochrane CENTRAL via Ovid, CINAHL Complete via Ebsco, and Web of Science) was performed

• Search included both keywords and subject headings to reflect cochlear implants AND retrocochlear pathologies
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• Inclusion Criteria:
  – 18 years or older
  – Diagnosed with retrocochlear pathologies
  – Unilateral or bilateral CI
  – Post-CI hearing outcomes with a minimum follow-up of 6 months
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  – 18 years or older
  – Diagnosed with retrocochlear pathologies
  – Unilateral or bilateral CI
  – Post-CI hearing outcomes with a minimum follow-up of 6 months

• **Exclusion Criteria:**
  – Prior surgery for vestibular schwannoma
• **53 publications** between 1996-2021 from 17 countries
• All Oxford Centre for Evidence Based Medicine level of evidence 4

Search Results and Study Characteristics

Identification of studies via databases and registers

- Records identified from:
  - PubMed/MEDLINE (n = 528)
  - CENTRAL (Ovid) (n = 8)
  - Embase (Ovid) (n = 1197)
  - Web of Science (n = 1023)
  - CINAHL (Ebsco) (n = 996)
  - Total Retrieval (n = 3752)

- Records screened (n = 2524)
- Reports sought for retrieval (n = 179)
- Reports assessed for eligibility (n = 179)
- Studies included in review (n = 53)
  - Reports of included studies (n = 53)

- Records removed before screening:
  - Duplicate records removed (n = 1228)
- Records excluded (n = 2345)
- Reports not retrieved (n = 0)

- Reports excluded:
  - Wrong Outcomes (n = 26)
  - Wrong Intervention (n = 21)
  - Conference Abstract (n = 21)
  - Wrong Population (n = 21)
  - Wrong Study Design (n = 19)
  - Non-English (n = 11)
  - Wrong Setting (n = 4)
  - Insufficient Follow-Up (n = 2)
  - Duplicated Data (n = 1)
Search Results and Study Characteristics

• 171 patient cases with minimum follow-up of 6 months
  – Mean age 54.0 years (SD: 16.2)
  – 60% Male
  – Mean duration of hearing loss 105.1 months (8.8 years)
Search Results and Study Characteristics

Vestibular Schwannoma (n = 99, 57.9%)

Superficial Siderosis (n = 39, 22.8%)

Neurosarcoidosis (n = 11, 6.4%)

Previous CNS/skull base irradiation (n = 22, 12.9%)
Search Results and Study Characteristics

Vestibular Schwannoma (n = 99, 57.9%)

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Search Results and Study Characteristics

Vestibular Schwannoma (n = 99, 57.9%)

- Irradiated (n = 46, 46.5%)
- Observed (n = 53, 53.5%)
- NF2 (n = 68, 68.7%)
- Sporadic (n = 25, 25.3%)

?
## Speech Discrimination Outcomes

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Previous irradiation and NF2 status does not appear to affect speech outcomes in those with VS

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<td>Coef (95% CI)</td>
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<td>Age at surgery</td>
<td>0.19 (-0.001, 0.38)</td>
<td>NS</td>
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<td>NF-2 associated tumor</td>
<td>14.20 (-13.51, 41.91)</td>
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<td>Maximum tumor dimension</td>
<td>-1.07 (-8.18, 6.03)</td>
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<td>Prior irradiation</td>
<td>-10.33 (-22.61, 1.95)</td>
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Patients achieved significant sustained benefit with limited adverse events

- 82% were regular daily users, and overall, 82% of cases benefitted
- Average minimum length of known sustained benefit was 29 months
- Tinnitus suppression?
- Limited adverse events
  - Two patients with VS had progressive performance decline with concomitant tumor growth, requiring device removal
Disease Progression in Superficial Siderosis
Conclusion

- Cochlear implantation in patients with retrocochlear pathology generally results in improved speech discrimination scores
- In patients with vestibular schwannomas, previous irradiation and NF2 status did not appear to affect speech outcomes
THANK YOU