Pharmacologic Vestibular Ablation Using Intratympanic Gentamicin Prior to Vestibular Schwannoma Surgery: A Systematic Review

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Background

- Vestibular schwannoma surgery in patients with ipsilateral vestibular function causes sudden vestibular dysfunction.
- Often prolonged rehabilitation is required prior to achieving vestibular compensation.
- Imbalance, instability, and vertigo can cause substantial morbidity and affect quality of life.
- Pre-operative ablation of ipsilateral vestibular function may reduce burden of recovery after surgery.
- Gentamicin is a vestibulotoxic antibiotic used to treat intractable vertigo in Meniere's disease.
- Intratympanic gentamicin (ITG) may be used to achieve pharmacologic ablation of vestibular function pre-operatively in vestibular schwannoma patients.

Methods

- Systematic review performed studies assessing use of ITG for pre-operative vestibular ablation in vestibular schwannoma patients.
- PRISMA 2020 guidelines were followed.
- PICOTS framework used to perform search.
- PubMed/MEDLINE, CINAHL, and SCOPUS databases were searched.
- Abstract reviewed and full test reviewed by two authors (TAL and SM). Discrepancies resolved by another (TRP).
- Data extracted from selected studies by TRP
  - study design, inclusion/exclusion criteria, number of subjects, gentamicin injection protocol, method for confirmation of vestibular ablation following injection, outcomes measured, results, adverse effects
- Quality assessment was performed for studies included.

Results

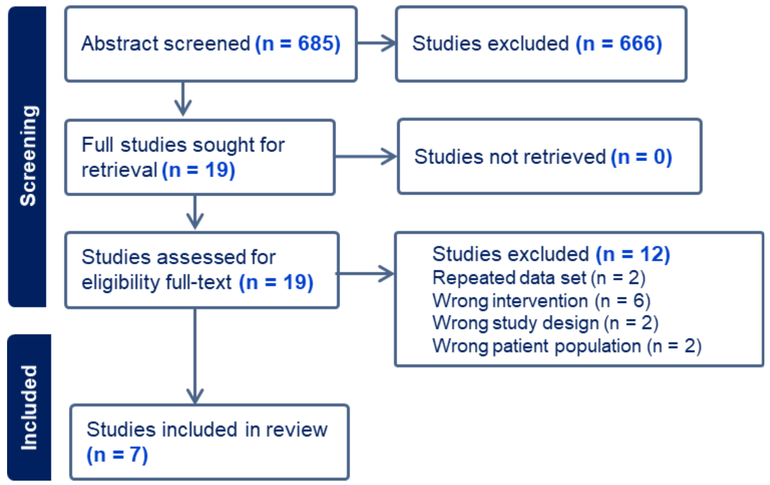

Figure 1 (above): Flow diagram showing review process.

Table 1 (below): Data extracted from review of included studies.

Authors	Year	Study Design	Exclusion Criteria	ITG Group Size	Control Group Size	Outcomes Measured	Results
Amiraraghi, et al.	2019	Prospective Cohort	Unspecified	4	4	-LOS -Contralateral vHIT	-Shorter LOS in ITG group (9.5 vs 6.75 days) -None of ITG group had contralateral abnormal vHIT -All controls had at least 1 contralateral canal with abnormal vHIT
Balatkova, et al.	2020	Prospective Cohort	-Positive HIT -Hearing preservation candidate	11	21	-GBI, GHSI -DHI -Zung Depression Scale -GAD-7 -Questionnaire -SVV	-ITG patients with lower GAD-7 scores -ITG group had better GBI after surgery -ITG patients less sensitive to head position changes and visual stimulation
Cada, et al.	2016	Prospective Cohort	-Positive HIT -Hearing preservation candidate	10	10	-GBI, GHSI -DHI -Questionnaire	-No differences in the GBI, GHSI, and DHI results. -ITG patients more resilient to sensory overload
Fellman, et al.	2021	Retrospective Cohort	-No ipsilateral vestibular function -Hearing preservation candidate	29	31	-LOS -DHI -FGA	-No difference in LOS, DHI, FGA
Hruba, et al.	2019	Prospective Cohort	-No ipsilateral vestibular function -Hearing preservation candidate	16	36	-SVV -Posturography -ABC Scale	-No difference in SVV, ABC, posturography
Tjernstrom, et al.	2009	Retrospective Cohort	-No ipsilateral vestibular function -CNS abnormality -Data not available	6	8	-Posturography	-ITG group had less postural sway
Tjernstrom, et al.	2017	Retrospective Cohort	-No ipsilateral vestibular function -CNS abnormality -Data not available	20	24	-Posturography	-ITG patients have better postural control long term after surgery

ITG: intratympanic gentamicin, LOS: length of stay, vHIT: video head impulse test, HIT: head impulse test, GBI: Glasgow Benefit Inventory, GHSI: Glasgow Health Status Inventory, DHI: Dizziness Handicap Index, GAD-7: Generalized Anxiety Disorder Assessment-7, SVV: subjective visual vertical, FGA: Functional Gait Assessment, ABC scale: Activities-specific Balance Confidence scale

Discussion/Conclusions

- No randomized controlled trials
- Many different outcome measures reported
- Unable to perform meta-analysis
- 1 study showed shorter length of stay after ITG use while another concluded no difference
- No adverse effects reported
  - Should avoid in hearing preservation candidates
- Overall, evidence is highly mixed

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