Treatments for Meniere’s Disease

Alan L. Cowan, MD
Faculty Advisor: Tomoko Makishima, MD, PhD
The University of Texas Medical Branch
Department of Otolaryngology
Grand Rounds Presentation
December 13, 2006
History

1861 – Prosper Meniere describes classic symptoms and attributes to labyrinth

1871 – Knappin theorizes dilatation of membranous Labyrinth

1938 – Hallpike and Portman confirm endolymphatic hydrops via temporal bone histology

1972 – AAOO defines the disease criteria

1985 – AAO-HNS revises the definition and establishes reporting protocols

1995 – AAO-HNS revises the definition and reporting protocols again
Physiology

**Perilymph**
- Located in the Scala Vestibuli / Tympani
- Similar in composition to CSF
- High Na+, Low K+

**Endolymph**
- Located in the Scala Media
- Similar in composition to ICF
- Low Na+, High K+
- Site of production in Stria Vascularis

**Membranous Labyrinth separates the compartments**
- No difference in pressure
Pathophysiology

- Endolymphatic hydrops leads to distortion of membranous labyrinth
- Reisner’s membrane can be seen bulging into the scala vestibuli in some histologic studies
- Microruptures may lead to episodic attacks which resolve when the tears heal
Pathophysiology

Theories behind endolymphatic hydrops

- Obstruction of endolymphatic duct/sac
- Hypoplasia of endolymphatic duct/sac
- Alteration of absorption of endolymph
- Alteration in production of endolymph
- Autoimmune insult
- Vascular origin
- Viral etiology
Diagnosis
Meniere’s is diagnosed by

- Vertigo
  - Spontaneous, lasting minutes to hours
  - Recurrent, must have more than 1 episode
  - Associated with nystagmus
- Hearing loss
  - Fluctuating sensorineural
  - Low-frequency or flat
- Tinnitus

Vertigo treatment reporting standard

- 0 = Complete control
- 1-40 = Substantial control
- 41-80 = Limited control
- 81-120 = Insignificant control
- > 120 = Worse

Hearing treatment reporting standard

- PTA reported 500, 1000, 2000, 3000 kHz
- If multiple pre and post levels are available, the worst is always used
- PTA is considered improved / worse if a 10 dB difference is noted
- SDS is considered improved / worse if a 15% difference is noted
Meniere’s is diagnosed by

- **Vertigo**
  - Spontaneous, lasting minutes to hours
  - Recurrent, must have 2 episodes > 20 min.
  - Nystagmus during episodes

- **Hearing loss**
  - Avg (250, 500, 1000) 15 dB < Avg (1000, 2000, 3000) or
  - Avg (500, 1000, 2000, 3000) 20 dB > than other ear
  - For bilateral disease Avg (500, 1000, 2000, 3000) > 25 dB in the studied ear

- **Tinnitus**
  - No guidelines

- **Aural pressure**
  - No guidelines
Possible Meniere's disease
- Episodic vertigo of the Meniere's type without documented hearing loss, or
- Sensorineural hearing loss, fluctuating or fixed, with dysequilibrium but without definitive episodes
- Other causes excluded

Probable Meniere's disease
- One definitive episode of vertigo
- Audiometrically documented hearing loss on at least one occasion
- Tinnitus or aural fullness in the treated ear
- Other causes excluded

Definite Meniere's disease
- Two or more definitive spontaneous episodes of vertigo 20 minutes or longer
- Audiometrically documented hearing loss on at least one occasion
- Tinnitus or aural fullness in the treated ear
- Other cases excluded
- See staging chart

Certain Meniere's disease
- Definite Meniere's disease, plus histopathologic confirmation
- See staging chart

<table>
<thead>
<tr>
<th>Stage</th>
<th>PTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;=25</td>
</tr>
<tr>
<td>2</td>
<td>26-40</td>
</tr>
<tr>
<td>3</td>
<td>41-70</td>
</tr>
<tr>
<td>4</td>
<td>&gt;70</td>
</tr>
</tbody>
</table>
Functional Level Scale

Regarding my current state of overall function, not just during attacks (check the ONE that best applies):

1. My dizziness has no effect on my activities at all.

2. When I am dizzy I have to stop what I am doing for a while, but it soon passes and I can resume activities. I continue to work, drive, and engage in any activity I choose without restriction. I have not changed any plans or activities to accommodate my dizziness.

3. When I am dizzy, I have to stop what I am doing for a while, but it does pass and I can resume activities. I continue to work, drive, and engage in most activities I choose, but I have had to change some plans and make some allowance for my dizziness.

4. I am able to work, drive, travel, take care of a family, or engage in most essential activities, but I must exert a great deal of effort to do so. I must constantly make adjustments in my activities and budge my energies. I am barely making it.

5. I am unable to work, drive, or take care of a family. I am unable to do most of the active things that I used to. Even essential activities must be limited. I am disabled.

6. I have been disabled for 1 year or longer and/or I receive compensation (money) because of my dizziness or balance problem.
Reporting Results of Treatment:

Vertigo treatment reporting standard
- A = 0
- B = 1-40
- C = 41-80
- D = 81-120
- E > 120
- F = Secondary treatment required due to disabling vertigo

Hearing treatment reporting standard
- PTA reported 500, 1000, 2000, 3000 kHz
- If multiple pre and post levels are available, the worst is always used
- PTA is considered improved / worse if a 10 dB difference is noted
- SDS is considered improved / worse if a 15% difference is noted
“Natural History”


- 1985 AAO criteria
- Studied a group of patients who failed medical treatment and declined surgery
- Vertigo
  - 57-60% complete control in 2 years
  - 71% complete control at 8 years (average)
- Hearing
  - 43% unchanged in unoperated patients
  - 45% unchanged in operated patients
- Conclusion
  - “Given sufficient length of follow-up, a large proportion of patients will have a spontaneous ‘cure’ of vertigo.”
Placebo Effect

Multiple studies of both medical and surgical therapies have shown high levels of improvement with placebo.

Torok (1977)

- “… the ultimate results, whatever course of medication or surgery was applied. Recovery varies from about 60% to 80% …improved are 20% to 30% and …failure is between 10% and 25%.”

Jongkees (1964)

- “Result of treatment depends more upon the personality of the doctor and the belief he has in his treatment.”
Medical Therapy
## Acute Therapy

<table>
<thead>
<tr>
<th></th>
<th>Sedative</th>
<th>Anticholinergic</th>
<th>Antiemetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promethazine (Phenergan)</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Diphenhydramine (Benadryl)</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Dimenhydrinate (Gravol)</td>
<td>+++</td>
<td>++</td>
<td>++++</td>
</tr>
<tr>
<td>Hyoscine (Scopolamine)</td>
<td>++</td>
<td>+++</td>
<td>++++</td>
</tr>
<tr>
<td>Prochlorperazine (Stemetil)</td>
<td>++</td>
<td>+</td>
<td>++++</td>
</tr>
<tr>
<td>Meclizine (Bonamine)</td>
<td>+</td>
<td>+</td>
<td>++++</td>
</tr>
</tbody>
</table>
Medical Therapy

Wennmo, et al. (1987)
- Double blinded study of 54 patients with Dramamine, Scopolamine, and placebo showed no differences in vertigo, tinnitus, or nausea

Towse (1980)
- Cinnarazine and Prochlorperazine have been shown to have some benefit over placebo for acute therapy
Vasodilators

- Thought to work by decreasing ischemia in the inner ear and allowing better metabolism of endolymph.

- Betahistine is a popular choice, with several studies showing decreased vertigo with use.

- Cochrane Database Review (2004) – Only one Grade B study and four Grade C studies, none of which produced convincing evidence for use.

- Controversial mechanism of action due to efficacy of anti-histamine medications.
Diuretics and Salt restriction

Klockoff and Lindblom (1967)
- Study of HCTZ vs. placebo in 30 patients and found that there may be improved benefit with diuretic therapy

Klockoff (1974)
- Long-term treatment over 7 years with chlorthalidone showed symptomatic improvement in 76% of patients

Shinkawa/Kimura (1986)
- Unable to demonstrate beneficial effect on hydrops in animal model.

Ruckenstein (1991)
- Revised Klockoff’s analysis and showed that there was no significant difference
- Placebo was >50% effective
Diuretics and Salt restriction

Osmotic Diuretics (Urea, Glycerol)
- Unpleasant taste
- Have been consistently shown to reduce symptoms in a proportion of patients, but the effects only last for a few hours
- Objective data includes alteration of the SP:AP ratio on electrocochleography

Acetazolamide
- IV administration has been shown to worsen hydrops and hearing loss (Brookes)
- Oral administration may improve hydrops (Shinkawa)
- Side effects encountered include metabolic acidosis and renal calculi (Brookes)
Diuretics

Thirlwall, Kundu (2006)

- Cochrane Database Systematic Review
- Criteria
  - Randomised controlled trials of diuretic versus placebo in Meniere’s patients (1974-2005)
- Results
  - No trials of high enough quality to meet criteria for review
- Conclusion
  - Insufficient evidence of the effect of diuretics on vertigo, hearing loss, tinnitus or aural fullness in clearly defined Meniere’s disease.
Water Therapy


- Prospective study
- Patients: 18 test, 29 control
- Test group: 35 mL/kg/day H2O x 2 years
- Control group: Diuretics and salt restriction
- Timeline: 2 years
- Results:
  - Low frequency PTA’s significantly improved in the water therapy group
  - Vertigo resolved in both groups
Meniett Device

Transtympanic “Micropressure” Treatment

- FDA approved in 1999 as a class II device
- Treatment self-administered TID
- Each treatment is three 1-minute cycles
- Applies intermittent, alternating pressure 0-20 cm H2O
- Requires a tympanostomy tube
Meniett Device

- Design: Prospective study, 10 patients, 3-10 months
- Criteria: “active symptoms of vestibular or cochleovestibular hydrops”
- Vertigo
  - 90% Complete control (presumed level A)
  - 10% with “50%” reduction (response level C)
- Functional Level
  - Improved 1-3 levels in all cases
- Problems
  - Tube otorrhea, blockage, extrusion
  - Recurrence of disease after therapy cessation

Densert and Sass (2001)
- Design: Prospective, 37 patients, 2 years
- Vertigo
  - Control 51% (level A?)
  - Improvement 41% (level B/C?)
  - Failure 8%
Meniett Device

Thomsen et al (2005)

- Prospective, randomized, placebo control trial of “overpressure” device in 40 patients
- Placebo device did not generate pressure
- AAO-HNS 1995 standards were used
- Definite Meniere’s patients only
- Functional levels monitored

Vertigo
- Both groups had large decreases in the number of attacks
- No statistical significance between active and placebo, although “there was a trend … toward a reduction”
- Significant improvement over the placebo was found in patient perception (VAS) of vertigo control.

Functional Level
- Statistical significance in the improvement of functional level between placebo and overpressure
Intratympanic Therapy
## Intratympanic Steroids

<table>
<thead>
<tr>
<th>Author</th>
<th>Med</th>
<th>Protocol</th>
<th>Pts</th>
<th>A</th>
<th>A&amp;B</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sennaroglu</td>
<td>Dex 1mg/ml</td>
<td>QoD x 3 mon</td>
<td>24</td>
<td>41%</td>
<td>72%</td>
<td>No change in tinnitus or HL</td>
</tr>
<tr>
<td>Hirvonen</td>
<td>Dex 16mg/ml</td>
<td>3 doses in 1 wk</td>
<td>17</td>
<td>76%</td>
<td></td>
<td>No change in tinnitus or HL</td>
</tr>
<tr>
<td>Barrs</td>
<td>Dex 4mg/ml</td>
<td>2x/wk x 1mon</td>
<td>21</td>
<td>52%</td>
<td></td>
<td>3 month data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43%</td>
<td></td>
<td>6 month data</td>
</tr>
<tr>
<td>Barrs</td>
<td>Dex 10mg/ml</td>
<td>Qwk x 4-6 wks</td>
<td>34</td>
<td>32%</td>
<td></td>
<td>2 year data</td>
</tr>
<tr>
<td>Arriaga</td>
<td>Dex 8mg/ml</td>
<td>IT gelfoam x 1</td>
<td>15</td>
<td></td>
<td></td>
<td>No improvement in hearing</td>
</tr>
<tr>
<td>Silverstein</td>
<td>Dex 8mg/ml</td>
<td>Qd x 3 days</td>
<td>20</td>
<td></td>
<td></td>
<td>No improvement in hearing or tinnitus</td>
</tr>
</tbody>
</table>
Intratympanic Ablation

Fowler (1948) and Schuknecht (1957) established role of aminoglycoside therapy.

- Streptomycin used initially
- Vertigo eliminated in all patients
- Profound hearing loss in all patients

Gentamicin treatment now preferred

- Theoretical targets of therapy are
  - Dark cells of the stria vascularis
  - Planum semilunatum of the semicircular canals
- Higher doses destroy the hair cells of the cochlea
Intratympanic Gentamicin

Gentamicin is preferred because it is more vestibuloselective

Side effects can include:
- Temporary imbalance or nystagmus
- Hearing loss
- Tinnitus

Many methods of delivery exist
- Injection (with or w/o PET)
- Gelfoam placement
- Microwick

Multiple dosing schedules have been proposed
- Low dose
- Weekly
- Multiple Daily
- Continuous
- Titration
Intratympanic Gentamicin
Low dose therapy

Harner et al (2001)

- Retrospective study
- Patients: 51
- Dosing: 1 dose of 40mg/mL injection, re-evaluated at 1 month and given another if needed
- Vertigo: 86% Class A/B (2 yrs)
- Hearing
  - PTA minimal change
  - SRT some drop
- Authors claim better hearing preservation
Intratympanic Gentamicin
Multiple Daily Dosing

Jackson and Silverstein (2002)

- Patients: 92
- Method: Patients underwent myringotomy and wick placement for medication delivery to round window
- Gentamicin self-administered TID until 100% reduction of ENG vestibular response
- Vertigo: 85% relief
- Aural Pressure: 67% improvement
- Hearing loss: 36%
Intratympanic Gentamicin Titration Therapy

Martin and Perez (2003)

- Prospective study
- Patients = 71
- Daily Gent. injections into middle ear
- Injections repeated until vestibular symptoms developed (spontaneous or evoked nystagmus)
- At 2 years,
  - Class A control 69%
  - Class B control 14.1%
- Hearing loss in 32.4%
Intratympanic Gentamicin

Other methods of delivery

- **Weekly administration**
  - Single dose of gentamicin once a week for four treatments

- **Continuous administration**
  - Microcatheter delivery of gentamicin using a continuous perfusion method
  - Results in extremely variable amount of gentamicin delivery
Intratympanic Gentamicin
**Intratympanic Gentamicin**

*Chia et al (2004)*

<table>
<thead>
<tr>
<th>Dosing Schedule</th>
<th>Study Authors</th>
<th># pts</th>
<th># pts profound HL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multiple Daily</strong></td>
<td>Corsten, et al. (1997)</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Toth and Parnes (1995)</td>
<td>21</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Kaplan, et al. (2000)</td>
<td>90</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Pfleiderer (1998)</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Sennaroglu, et al. (2001)</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Nedzelski, et al. (1993)</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>McFeatly, et al. (1999)</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td><strong>Weekly</strong></td>
<td>Toth and Parnes (1995)</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td><strong>Low Dose</strong></td>
<td>Atlas and Parnes (1999)</td>
<td>68</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Quaranta, et al. (1999)</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Abou-Halawa and Poe (2002)</td>
<td>87</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Youssef and Poe (1998)</td>
<td>37</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Magnusson and Padoan (1991)</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Driscoll, et al. (1997)</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Longridge and Mallinson (2000)</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Quaranta, et al. (2001)</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td><strong>Continuous</strong></td>
<td>Harner, et al. (2001)</td>
<td>56</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Schoendorf, et al. (2001)</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td><strong>Titration</strong></td>
<td>Thomsen, et al. (2000)</td>
<td>27</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Hoffer, et al. (2001)</td>
<td>36</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Seidman (2002)</td>
<td>83</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Laitakari (1989)</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Odkvist (1988)</td>
<td>29</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Hirsh and Kamerer (1997)</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Minor (1999)</td>
<td>34</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Beck (1986)</td>
<td>118</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Beck and Schmidt (1978)</td>
<td>40</td>
<td>0</td>
</tr>
</tbody>
</table>

Overall: 980 pts, 65 with profound hearing loss.
Intratympanic Gentamicin

Multiple Daily
- Highest cumulative Gent dose
- Highest rate of hearing loss (34.7%, significant)
- Vertigo control comparable with other methods

Weekly
- Lowest rate of hearing loss (13.1%)
- Slightly lower rate of vertigo control (not significant)

Low-Dose
- Lowest cumulative Gent dose
- Hearing loss comparable to most other methods
- Lowest rate of vertigo control (significant)

Continuous
- Wide range of Gent delivery
- Comparable hearing results
- Comparable vertigo control

Titration
- Comparable hearing results
- Highest rate of vertigo control (significant)
Surgical Therapy
Endolymphatic Sac Surgery

Types of procedures

- Decompression: removal of bone overlying the sac
- Shunting: placement of synthetic shunt to drain endolymph into mastoid
- Drainage: incision of the sac to allow drainage
- Removal of sac: excision of the sac. Some believe the sac may play a role in endolymph production
Endolymphatic Sac Surgery
Jens Thomsen et al (1981)

- Double-blinded placebo-control study
- Patients: 30
- Procedure: Cortical mastoidectomy without decompression (sham) vs. endolymphatic shunt placement
- Results reported using 1972 AAOO guidelines

Results:
- Both surgery and placebo showed statistically significant improvements over pre-treatment status
- Physician evaluation showed good results in 73% of shunts vs. 80% of placebo
- Patient subjective evaluation showed good results in 73% of shunts vs. 67% of placebo

Conclusion:
“We are therefore of the opinion that the impact of surgery on the symptoms of Meniere’s disease is completely nonspecific and unrelated to the actual shunt procedure.”
Endolymphatic Sac Surgery

Thompsen et al (1981)
- Improvement in 73% ELS procedures vs. 80% of Mastoidectomy procedures

Pilsbury (1983)
- Used same data with AAOO criteria and found 87% of ELS procedures had improvement vs. 47% of Mastoidectomy procedures

Palmer (1983)
- Thompsen study greatly underpowered to substantiate any conclusions.
Endolymphatic Sac Surgery


- 1985 AAO criteria
- Compared different surgical interventions to unoperated Meniere’s patients
- Patients: 89 operated ears, 50 unoperated ears
- Vertigo
  - No difference between ELS and “natural history”
  - Nerve section significantly better than no surgery
  - ELS procedures resulted in 40% complete control vs. 91-100% complete control in nerve section patients
- Hearing
  - No difference in operated (all types) vs. unoperated ears
- Conclusion
  - “We conclude that endolymphatic sac shunt surgery should not be recommended to patients with Meniere’s disease.”
Endolymphatic Sac Surgery

Moffat (1997)
- 100 consecutive patients
- Results (AAO-HNS 1985 criteria)
  - Vertigo control: 42% Complete, 37% Substantial
  - Hearing: 15% Improved, 56% Unchanged, 29% Worsened

Tyagi et al (2006)
- Retrospective questionnaire analysis (39 pts)
- Improved functional level (84%), Class A control (82%)
- Retrospective. Questionnaire. No control group

Durland et al (2005)
- Prospective SF-36 survey (19 pts)
- Vertigo reduction: 8.3 to 2.6 times/month (p .006)
- SF-36 scores normalized to population controls in 5/6 areas that were below normal pre-op.
- Did not use AAO reporting criteria

Kaylie et al (2005)
- Retrospective review 229 patients (74 mastoid shunts)
- Mastoid shunt surgery was less effective at vertigo control than published rates for gentamicin
- Mastoid shunt is not associated with hearing loss and is a viable alternative.
Vestibular Nerve Section

Direct method of functional vestibular ablation

Single step procedure

Approaches:
- Middle Fossa
- Retrolabyrinthine/Retrosigmoid
- Transcanal

Complications
- Damage to facial nerve
- Damage to cochlear nerve
- CSF leak (about 13%)
Vestibular Nerve Section


- Retrospective chart review 229 pts (83 VNS)
- Vertigo control better than mastoid shunt but not as good as labyrinthectomy
  - 70.6% Class A
  - Other studies have shown 77% - 87% after VNS
- Hearing and speech discrimination scores seemed to decrease post-operatively, but were not statistically different from pre-op levels at 2 years.
- More disabled patients (Levels 5,6) were in the verve section group. Many failed to improve.
  - “patients who are disabled or who consider themselves disabled might not benefit from a nerve section. These patients may benefit from further analysis and counseling.”

Conclusion
- “Suboccipital vestibular nerve section has very good vertigo control rates that are comparable to those of gentamicin injection. It is a good option for more severe disease but may not have as good results in patients who are disabled from their disease preoperatively.”
Vestibular Nerve Section


- Retrospective comparison of VNS to IT Gentamicin
- High level of vertigo with minimal hearing change
- Low rate of complications (12.8% CSF leak)
- Conclude that both Gent and VNS are appropriate alternatives

### TABLE III.
Summary of Hearing Results in Both Groups.

<table>
<thead>
<tr>
<th>Hearing Assessment</th>
<th>VNS</th>
<th>IT Gent</th>
<th>P Value (Difference: VNS vs. IT Gent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretreatment PTA (dB)</td>
<td>47.2</td>
<td>55.9</td>
<td>.02</td>
</tr>
<tr>
<td>Post-treatment PTA (dB)</td>
<td>49.1</td>
<td>68.8</td>
<td>.0005</td>
</tr>
<tr>
<td>Difference in PTA before vs. after treatment (dB)</td>
<td>1.9</td>
<td>12.9</td>
<td>.01</td>
</tr>
</tbody>
</table>

**P value (difference before vs. after treatment)**

| Pretreatment SDS (%)                    | 75.4 | 62      |
| Posttreatment SDS (%)                   | 75   | 49.3    |

VNS, vestibular nerve section group; IT Gent, intratympanic gentamicin group; PTA, pure-tone average; SDS, speech discrimination score.

### TABLE IV.
Vertigo Control Questionnaire Results by Control Class and Functional Level.

<table>
<thead>
<tr>
<th>Control Class</th>
<th>VNS (n = 25)</th>
<th>IT Gent (n = 15)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>A</td>
<td>14 (56)</td>
<td>8 (53)</td>
</tr>
<tr>
<td>B</td>
<td>9 (36)</td>
<td>2 (13)</td>
</tr>
<tr>
<td>C</td>
<td>1 (4)</td>
<td>1 (7)</td>
</tr>
<tr>
<td>D</td>
<td>1 (4)</td>
<td>1 (7)</td>
</tr>
<tr>
<td>E</td>
<td>0 (0)</td>
<td>3 (20)</td>
</tr>
<tr>
<td>F</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Level of function before treatment</td>
<td>4.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Level of function after treatment</td>
<td>1.5</td>
<td>1.9</td>
</tr>
</tbody>
</table>

*The functional level scale ranges between a best score of 1 and a worst score of 6.*
VNS, vestibular nerve section group; IT Gent, intratympanic gentamicin group.
Labyrinthectomy

Kaylie et al (2005)
- Retrospective review 229 patients
- Vertigo control (A) 95.2%, (B) 4.8%
- Functional scores post-operatively higher than any other procedure

Kemink, Telian, Graham (1989)
- Vertigo control (A) 100%
Overview

Acute Therapy

Long-Term Stabilization
- Non-invasive medical treatments
- Alternative options

Non-Destructive Therapy
- Medical: IT Steroids
- Surgical: Mastoid shunt

Destructive Therapy
- Medical: IT Gentamicin
- Surgical
  - Nerve section
  - Labyrinthectomy

Diuretics
- Salt Restriction
- Vasodilators

VestibularSuppressants

Alternative Therapies
- Meniett
- Herbal
- Hypnosis
- ? Water Therapy

Intratympanic Steroid Therapy

Intratympanic Gentamicin Therapy

Surgical Ablation
- Nerve Section
- Labyrinthectomy
Final Thought

Research to verify natural history of Meniere’s disease would be beneficial in evaluation of long-term treatment efficacy.
Bibliography


James, AL, et al. Betahistine for Meniere’s disease or syndrome. Cochrane Database of Systematic Reviews (2) 2005


Torok, Nicholas. Old and New in Meniere Disease. Laryngoscope. 1977 87:1870-1877


Committee on Hearing and Equilibrium Guidelines for Diagnoses and Evaluation of Therapy in Meniere’s Disease, AAOHNS Board of Directors March 1994

Minor, Lloyd et al, Meniere’s Disease, Current Opinion in Neurology 17(1) Feb2004


Kaylie, Jackson, Gardner. Surgical management of Meniere’s disease in the era of Gentamicin. Otolaryngology Head and Neck Surgery. 2005 March; 122(3) : 443-50

