Intratympanic Dexamethasone for Sudden Sensorineural Hearing Loss After Failure of Systemic Therapy

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Definition:

Idiopathic sudden sensorineural hearing loss (SNHL) is defined as a decline in hearing over 3 days or less affecting 3 or more frequencies by 30 dB or greater, with no identifiable etiology (Wilson 1980).

(NIDCD definition)

Sudden SNHL

Disproportionate interest:
(>2,000 articles written since 1966 or 1.3 articles per week)

- Reversible hearing loss
- Local expertise required
- Temporal relationship to negative outcome
- Patient frustration

### Etiology of Sudden SNHL

<table>
<thead>
<tr>
<th>Etiology</th>
<th>Examples</th>
<th>Potential treatment (in addition to steroids)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viral infection</td>
<td>HSV, Ramsay Hunt</td>
<td>Antiviral agents</td>
</tr>
<tr>
<td>Bacterial infection</td>
<td>Syphilis, Lyme</td>
<td>Antibiotics</td>
</tr>
<tr>
<td>Vascular occlusion</td>
<td>Carotid artery, hypercoagulable state</td>
<td>Anti-inflammatory agents</td>
</tr>
<tr>
<td>Vestibular disease</td>
<td>Ménière's disease</td>
<td>Diuretics, low sodium diet</td>
</tr>
<tr>
<td>Labyrinthitis</td>
<td>Vertebrobasilar</td>
<td>Anti-inflammatory agents</td>
</tr>
<tr>
<td>Meniere's disease</td>
<td>Lyme, Ramsay Hunt</td>
<td>Dexamethasone perfusion</td>
</tr>
<tr>
<td>Meningitis</td>
<td>Viral, bacterial, septic</td>
<td>Anti-inflammatory agents</td>
</tr>
<tr>
<td>Metabolic disorders</td>
<td>Diabetes, hypothyroidism</td>
<td>Replacement therapy</td>
</tr>
<tr>
<td>Hereditary disorders</td>
<td>Usher's syndrome, Pendred's syndrome</td>
<td>Genetics consult</td>
</tr>
<tr>
<td>Hypoxia</td>
<td>Carotid artery, hypothyroid, post-surgical anesthesia</td>
<td>Neurology consult</td>
</tr>
<tr>
<td>Toxic agents</td>
<td>Antimicrobials, hydration</td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasm</td>
<td>Squamous cell carcinoma</td>
<td>Surgery, radiation, chemotherapy</td>
</tr>
<tr>
<td>Benign neoplasms</td>
<td>Acoustic neuroma</td>
<td>Surgery, radiation, observation</td>
</tr>
<tr>
<td>Autoimmune hearing loss</td>
<td>Idiopathic, Coagulopathy</td>
<td>Diuretics, rheumatology consult</td>
</tr>
<tr>
<td>Cholesteatoma</td>
<td>Fistula, inflammation</td>
<td>Surgery, antibiotics</td>
</tr>
<tr>
<td>Ototoxic hearing loss</td>
<td>Idiopathic, Meniere's disease</td>
<td>Anti-inflammatory agents</td>
</tr>
<tr>
<td>Thromboembolic events</td>
<td>Carotid artery, hypercoagulable state</td>
<td>Aspirin, warfarin, heparin, Anti-inflammatory agents</td>
</tr>
</tbody>
</table>

### Diagnostic tests

<table>
<thead>
<tr>
<th>Diagnostic Test</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete blood count</td>
<td>Lymphoma, leukemia</td>
</tr>
<tr>
<td>ANA</td>
<td>Autoimmune disorder</td>
</tr>
<tr>
<td>FTA-ABS or MHA-TP</td>
<td>Syphilis</td>
</tr>
<tr>
<td>Lyme-Benz</td>
<td>Lyme disease</td>
</tr>
<tr>
<td>ESR</td>
<td>Inflammatory disorder, vasculitis etc.</td>
</tr>
<tr>
<td>MRI with Gadolinium</td>
<td>Acoustic neuroma, glomus jugulare, stroke, abcess temporal lobe</td>
</tr>
<tr>
<td>CT temporal bone</td>
<td>Meningeal, enlarged vestibular aqueduct</td>
</tr>
<tr>
<td>HIV</td>
<td>AIDS</td>
</tr>
<tr>
<td>Western blot</td>
<td>Immune mediated inner ear disease</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Hypercholesterolemia</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>Hypertriglyceridemia</td>
</tr>
<tr>
<td>Glucose</td>
<td>Diabetes</td>
</tr>
<tr>
<td>Immunoglobulins IgA, IgG, IgM</td>
<td>Immune deficiency disorders</td>
</tr>
<tr>
<td>Audiogram</td>
<td>Standard</td>
</tr>
<tr>
<td>ASR</td>
<td>Standard</td>
</tr>
<tr>
<td>GME</td>
<td>Standard</td>
</tr>
<tr>
<td>PT/PTT/pulse</td>
<td>Hypercoagulable state</td>
</tr>
<tr>
<td>creatinine</td>
<td>Renal disease</td>
</tr>
</tbody>
</table>

### Proposed therapies for sudden SNHL

- Steroids
- Antiviral agents
- Aspirin
- Coumadin
- Heparin
- Carbogen inhalation
- Anti-inflammatory agents
- Diuretics
- Hyperbaric oxygen
- Dexamethasone perfusion
- Methylprednisolone perfusion
- Steroid pump infusion
- Plasmaphoresis
- Cytocan
- Methotrexate
- Dextran
- Histamine
- Calcium channel blockers
- Magnesium
Sudden SNHL

Treatment

Unknown etiology +
Multiple proposed etiologies + limited time
for treatment efficacy =
“shotgun therapy”

Sudden SNHL

Treatment Old (1994) “Vasodilator Regimen”

– In patient Admission for 3 days
– IV steroids
– Carbogen inhalation
– Oral pavabid or ethatab
– ASA
– Dyazide
– SQ heparin

Sudden SNHL

Treatment New (2008)

– In patient Admission for 3 days
– IV steroids
– Carbogen inhalation
– Oral pavabid or ethatab
– ASA
– Dyazide
– SQ heparin

Sudden SNHL

Natural History:

The natural history of untreated patients with sudden SNHL ranges from recovery rates of 31% to 65%, (1) (3) (4) (8)

Sudden SNHL

Treatment

The range of hearing recovery reported in the literature in treated patients ranges from 35% to 89%.


Sudden SNHL

Why the wide range?

- Inconsistent definition of Sudden SNHL
- Wide range of time frames in which patients were treated
- Wide range of hearing losses
- Inconsistent definition of “success” or “failure”

Sudden SNHL

Treatment

The range of hearing recovery reported in the literature in treated patients ranges from 35% to 89%.

The natural history of untreated patients with sudden SNHL ranges from recovery rates of 31% to 65%.


Sudden SNHL

Medrol Dose Pack (Methylprednisolone)

<table>
<thead>
<tr>
<th>Day</th>
<th>Medrol</th>
<th>Prednisone</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24 mg</td>
<td>30 mg</td>
</tr>
<tr>
<td>2</td>
<td>20 mg</td>
<td>25 mg</td>
</tr>
<tr>
<td>3</td>
<td>16 mg</td>
<td>20 mg</td>
</tr>
<tr>
<td>4</td>
<td>12 mg</td>
<td>15 mg</td>
</tr>
<tr>
<td>5</td>
<td>8 mg</td>
<td>10 mg</td>
</tr>
<tr>
<td>6</td>
<td>4 mg</td>
<td>5 mg</td>
</tr>
</tbody>
</table>

105 mg
Sudden SNHL

**DepoMedrol**

20mg/ml ; 40mg/ml ; 80mg/ml  *Methylprednisolone*

25mg/ml ; 50mg/ml ; 100 mg/ml  *Prednisone equivalent*

Generally 1ml injections given

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Sudden SNHL

**Common Dose:**

60-80 mg Prednisone Tapered over 10D to 2 wks

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Sudden SNHL

**Sudden Visual Loss**

500 – 1000 mg Methylprednisolone per day

- Informed consent
- Standard of Care
  - Is there?
  - What is it?
- Litigation
  - Peptic ulcer
  - Avascular necrosis of the hip
  - Hyperglycemia

---

Sudden SNHL

**Standard of Care?**

- What the majority of physicians are doing in the area
- What the “Thought Leaders” in the area are doing.
- What the Academy Guidelines say
- Defined by the national literature.
Actions of Steroids on the Cochlea

- Both glucocorticoid and mineralocorticoid receptors are found in the inner ear.
- Decrease inflammation from labyrinthitis
- Improve cochlear blood flow


Actions of Steroids on the Cochlea

- Reduce hearing loss in Meningitis (cochrane)
- Prevent loss of spiral ganglion neurons
- Modulate Na+/K+ in Endolymph
- Regulate transcriptional factors (AP-1)
- ? Ototoxicity


Actions of Steroids on the Cochlea

- protect against cochlear ischemia,
- protect against noise induced hearing loss
- improve stria vascularis function and morphology


Sudden SNHL

Systemic Steroids

In a double-blind placebo controlled study, Wilson et al showed a statistically significant benefit with systemic steroids in recovery of hearing in patients with sudden SNHL. (1) Others demonstrating benefit of systemic steroids (3) (5) (6) (7) (11)


Sudden SNHL

Systemic Steroids
Systemic steroids were shown to be of little to benefit in the treatment of sudden SNHL in several other studies.


2 RCT (Wilson/Cinamon) pooled for meta-analysis: no statistically significant difference between systemic steroids and placebo.


Intratympanic Dexamethasone for Sudden Sensorineural Hearing Loss After Failure of Systemic Therapy

[Thiological Society Papers: Candidate's Thesis]

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Intratympanic therapy = Transtympanic therapy = Middle ear perfusion = Inner ear perfusion
Methods of IT Therapy

Intratympanic Injection
Microwick
Microcatheter
Intra-operative irrigation
Hydrogel
Nanoparticles

Intratympanic Steroids

3 Physicians

• 3 separate injections 10 minutes apart, at the onset of therapy
• 3 separate injections 10 minutes apart, at the onset of therapy
• 1 injection at the completion of systemic therapy (“salvage therapy”)
• Never inject

ICD 9: Sudden Hearing loss. 389.10

CPT code: 69801, Labyrinthotomy/Infusion of Vestibuloactive Drugs
Methods of IT Therapy

**Hydrogel**
Dissolvable matrix (PLGA polymers) with thermoreversible properties that releases medication in a controlled mechanism

Dexamethasone, Br**ain-derived neurotrophic factor, insulin-like factor.**

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**Methods of Intra cochlear Delivery**

- Electrode Array with egress pathways connected to an external pump
- Coating an electrode array with a biorelease polymer
- Osmotic Pump Delivery
- Reciprocating Perfusion System (McKenna, et al Boston)
  - Microsystem technology
  - Micro drug delivery system (power/reservoir/sensors/release mechanisms)
  - Zero net fluid change

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**IT Dexamethasone**
Otonomy 22-222mg/ml

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**Issues with IT Therapy**
Loss via Eustachian tube
Absorption via Mucosa
Vehicle? Healon? Viscosity?
Round window contact
Round Window Adhesions (30%)
Concentration gradient
Ototoxicity of vehicle/preservatives
Delivery Time
Cochlear Pharmacokinetics
Sudden SNHL

Intratympanic therapy
- When?
- How?
- Which steroid?
- How often?
- Concentration?
- If?

Sudden SNHL

Timing
- Perform dexamethasone perfusion at the onset of systemic therapy
- Perform a dexamethasone perfusion only, eliminating systemic side effects from steroids while delivering steroids to the affected ear.
- Perform dexamethasone perfusion for patients failing to respond to medical therapy (salvage).

Sudden SNHL

Intratympanic steroids – dosing schedule
- Single day
- Weekly intratympanic injections
- Multiple weeks with self-administered steroid drops
- Intratympanic injections given several times per week
- Implantable pump

Itoh was the first to report on the use of intratympanic steroids for inner ear disease (for Meniere’s disease) in 1991.
The first report on the use of intratympanic steroids for sudden SNHL was by Silverstein in 1996

Table 8: Summary of Studies published to date on Intratympanic Steroids for Sudden SNHL.

<table>
<thead>
<tr>
<th>Author</th>
<th>Number of patients</th>
<th>Steroid type</th>
<th>Time course from hearing loss</th>
<th>Number of injections</th>
<th>Study Type</th>
<th>% improved</th>
<th>Criteria for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silverstein, et al 1996</td>
<td>8</td>
<td>Dex (various doses)</td>
<td>Up to 3 times a week for 3-4 weeks</td>
<td>NA</td>
<td>salvage</td>
<td>25%</td>
<td>15 dB PTA 15% SDS</td>
</tr>
<tr>
<td>Parnes, 1999</td>
<td>13</td>
<td>MP 40 mg/mL or Dex</td>
<td>2 days - 6 weeks</td>
<td>2-29</td>
<td>salvage and primary</td>
<td>46%</td>
<td>5 nl thresholds</td>
</tr>
<tr>
<td>Kopke, et al 2001</td>
<td>3</td>
<td>MP 62.5 mg/mL</td>
<td>Cather for 14 days</td>
<td>salvage</td>
<td>0%</td>
<td>10 dB PTA 15% SDS</td>
<td></td>
</tr>
<tr>
<td>Gianoli and Li 2001</td>
<td>25</td>
<td>Dex/MP 62.5 mg/mL</td>
<td>72 weeks</td>
<td>(9 injections over 14 days)</td>
<td>salvage</td>
<td>46%</td>
<td>15% SDS</td>
</tr>
<tr>
<td>Colleen and Stacker 2003</td>
<td>7</td>
<td>MP 62.5 mg/mL</td>
<td>Approx. 10 days</td>
<td>Cather for 14 days</td>
<td>salvage</td>
<td>100%</td>
<td>&lt; 14 dB PTA improved in hearing</td>
</tr>
<tr>
<td>Gouveris, 2003</td>
<td>9</td>
<td>Dex 24 mg/mL</td>
<td>NA</td>
<td>Systemic or 3 times a week for 2 days</td>
<td>NA</td>
<td>53%</td>
<td>Increase in SDS, decrease in PTA</td>
</tr>
<tr>
<td>Gouveris, 2003</td>
<td>15</td>
<td>Dex 10 mg/mL</td>
<td>Approx. 10 days</td>
<td>Cather for 14 days</td>
<td>salvage</td>
<td>53%</td>
<td>10 dB PTA: 20% SDS</td>
</tr>
<tr>
<td>Battista 2005</td>
<td>14</td>
<td>Dex 24 mg/mL</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Gouveris, 2003</td>
<td>3</td>
<td>Dex 6 mg/mL</td>
<td>2.45 days</td>
<td>2 injections (or) Every 2nd day</td>
<td>salvage</td>
<td>31%</td>
<td>30 dB PTA</td>
</tr>
<tr>
<td>Gouveris, 2003</td>
<td>10</td>
<td>Dex 6 mg/mL</td>
<td>2.45 days</td>
<td>2 injections</td>
<td>salvage</td>
<td>7%</td>
<td>CR: within 10 dB of unaffected ear; Partial: &gt;10 dB improvement; NS: less than 15 dB improvement</td>
</tr>
<tr>
<td>Gouveris, 2003</td>
<td>9</td>
<td>Dex 6 mg/mL</td>
<td>2.45 days</td>
<td>2 injections (or) Every 2nd day</td>
<td>salvage</td>
<td>31%</td>
<td>12% SDS</td>
</tr>
</tbody>
</table>

Sudden SNHL

13 studies on IT Steroids for Meniere’s Disease
28 studies on IT Steroids for SSNHL
For Sudden SNHL:
Only 13 had controls (systemic steroids) Only one study was Double-blinded.

Only 5 used the NIDCD definition of SSNHL

Sudden SNHL

1/1/2000 to 7/30/2005
312 procedures (Intratympanic steroids) in 195 patients.
**Table 2: Inclusion and Exclusion Criteria**

- Sudden, unilateral SNHL of at least 30 dB over 3 frequencies developing within 72 hours
- An audiogram was performed pre-treatment and at least 1 post therapy audiogram was performed
- Underwent a intratympanic injection with dexamethasone 24mg/ml at a single time period.
- No evidence of retrocochlear disease evident on MRI
- No prior history of otologic surgery
- No history of Meniere’s disease, autoimmune hearing loss, radiation induced hearing loss or other potential etiology for SNHL
- No history of acoustic trauma or barotrauma
- No history of genetic SNHL or known inner ear anomaly
- Failed systemic steroid trial, or did not receive steroid trial (i.e. patient refused, diabetes)
- No evidence of acute otitis media or chronic otitis media on examination
- Failed systemic steroids

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**Patient population**

- 40 patients were available for study.
  - 14 (35%) men and 26 (65%) women.
- The mean age was 54.8, with a range from 17 to 84 years of age.
- The mean age for the women was 58 years and for the men 48 years.
- The overall recovery rate for men was 35.7% and for women was 23%. *(p=0.5 Fisher Exact test)*

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**Dexamethasone Solution for Otic Injection (single injection)**

- **Ingredients:** Dexamethasone Sodium Phosphate, Powder, U.S.P. 120 mg
- **Starting Materials:**
  - Sterile empty 10 mL vials, dry only, for example, Abbott brand
  - Sterilized stainless steel spatula, vial stopper decapper and crimper, electronic scales with printer, serum bottle aluminum seals 20 mm
- **Compounding:**
  1. Use scale in Chemo preparation area
  2. Don appropriate compounding attire, including gown, mask, hair cover, and gloves. No other personnel should be in work area when weighing powder.
  3. Remove stoppers from 10 mL vials.
  4. Place vial on scale and tare weight.
  5. With stainless steel spatula, add 120 mg of powder to each vial.
  7. Label appropriately.
- **Dispensing Directions:**
  1. Dilute each vial with 5 mL of Preservative Free Sterile saline for a final concentration 24 mg/mL.
  2. Expiration date of diluted product 24 hours.
- **References:** Requested for use by physicians
- **Expiration Date:** Vials of powder 6 month expiration date, due to U.S.P standards
- **Storage:** Refrigerate, powder storage directions from manufacturer
- **Auxiliary Labels:** Refrigerate, powder storage directions from manufacturer

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**Sudden SNHL**

**Patient population**

- All treated with systemic therapy
- All failed systemic therapy
- Range from onset of symptoms to injection ranged from
- 5 days to 310 days (mean 40.1 days)
Sudden SNHL

**Results**

- Overall 40% (n=16) showed improvement in PTA or SDS. For those 37.5% (n=15) showing an improvement in PTA, the mean gain was 15 dB. For the 37.5% (n=15) showing an improvement in SDS, the mean gain was 31.9% (range 8-88).

- Using the criteria of 20 dB improvement in PTA or 20% improvement in SDS for success, a 27.5% (n=11) improvement was noted. For these 27.5% who had an improvement, an average improvement in PTA of 16.9 dB (range 0-42dB) and average improvement in SDS of 38.9% (range 8-88%) was noted.

- Seven patients (17.5%) showed worse PTA, with a mean decrease of 3.8 dB (range 2-7dB). Five patients (12.5%) showed worse SDS after injection, with a mean decrease of 16% (range 8-28%).

**RESULTS:**

Overall recovery: **27.5%** (20dB, 20%discrimination)

39% of patients recovering 20 dB or 20% SDS (if treated within six weeks)

(between 2 and 6 weeks after onset of symptoms),

**26%** improved by 20dB or 20% SDS

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**Table 9. Comparison of recovery rates in sudden SNHL treated with intratympanic steroids.**

<table>
<thead>
<tr>
<th>Author</th>
<th>% improved</th>
<th>Criteria for improvement</th>
<th>Current study with applied criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silverstein, et al (12)</td>
<td>25%</td>
<td>10 dB PTA 15% SDS</td>
<td>32.5%</td>
</tr>
<tr>
<td>Parnes, 1989 (13)</td>
<td>46%</td>
<td>5 dB thresholds, 1 serviceable hearing</td>
<td>88% (including only patients treated within 6wks)</td>
</tr>
<tr>
<td>Sepic, et al (15)</td>
<td>0%</td>
<td>10 dB PTA 15% SDS</td>
<td>0%</td>
</tr>
<tr>
<td>Sepic, et al (17)</td>
<td>83%</td>
<td>30 dB PTA 15% SDS</td>
<td>50% overall (including only patients treated within 6wks)</td>
</tr>
<tr>
<td>Chandrasekhar (14)</td>
<td>73%</td>
<td>Increase in SDS, decrease in PTA</td>
<td>40%</td>
</tr>
<tr>
<td>Gassman and Lu (15)</td>
<td>44%</td>
<td>10 dB PTA 10% SDS</td>
<td>40%</td>
</tr>
<tr>
<td>Latchis and Bacher (18)</td>
<td>50%</td>
<td>&gt; 20 dB improvement in PTA</td>
<td>12.5% overall (including only patients treated within 10 days)</td>
</tr>
</tbody>
</table>
Table 9. Comparison of recovery rates in sudden SNHL treated with intratympanic steroids.

<table>
<thead>
<tr>
<th>Study</th>
<th>Complete recovery (CR)</th>
<th>Partial recovery</th>
<th>No recovery (NR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gouveris (19) 2003</td>
<td>33.3%</td>
<td>39%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Jackson, 2002 (18)</td>
<td>31%</td>
<td>Positive response</td>
<td>40%</td>
</tr>
<tr>
<td>Ho, et al, 2004 (20)</td>
<td>5.5%</td>
<td>30 dB PTA</td>
<td>7.5%</td>
</tr>
<tr>
<td>Herr and Maras (21) 2005</td>
<td>5.5%</td>
<td>10 dB PTA</td>
<td>32.5%</td>
</tr>
<tr>
<td>Battista (24) 2005</td>
<td>8% full</td>
<td>Partial</td>
<td>2.5% partial</td>
</tr>
<tr>
<td>Slattery et al (9) 2005</td>
<td>55%</td>
<td>Partial</td>
<td>40%</td>
</tr>
</tbody>
</table>

Success range using criteria from previous articles on IT steroids for SSNHL (6 weeks or less)

12% - 60%

Intratympanic Steroids

Conclusions

- Dramatic recovery or late recovery was uncommon with IT steroids after idiopathic SSNHL
- Literature supports various definitions of “success” for Sudden SNHL
- Multiple papers providing mechanism of benefit for Steroids in cochlea
- Clinical benefit hard to prove
- Clinical use of systemic and intratympanic steroids will continue
- Emerging Technologies for drug delivery

Sudden SNHL

Intr tympanic Steroids for Sudden Sensorineural Hearing Loss: A Systematic Review

2011 Otolaryngology–Head and Neck Surgery

Samuel A. Spear, MD1, and Seth R. Schwartz, MD, MPH2

Intratympanic steroid treatment as primary treatment for sudden sensorineural hearing loss appears equivalent to treatment with high-dose oral prednisone therapy. As salvage therapy, intratympanic steroids offer the potential for some degree of additional hearing recovery, although it remains uncertain if this improvement is clinically significant and what percentage of patients is likely to show benefit.
Sudden SNHL

AAO-HNS Position on Sudden SNHL

- 8. Initial corticosteroids. Clinicians may offer corticosteroids as initial therapy to patients with ISSNHL. It is not clear that steroids may help ISSNHL patients, but a small possibility of hearing improvement through steroid use may be worth pursuing.
- 11. Salvage therapy. Clinicians should offer intratympanic steroid perfusion when patients have incomplete recovery from ISSNHL after initial therapy.

Rehabilitation

Current: Baha

- FDA approved for Unilateral SNHL
- Choose patients carefully
- Contralateral stimulation
- Poor localization

Future: Cochlear Implant

- Not FDA approved for unilateral SNHL
- Utilizes affected ear
- Binaural hearing
- Localization

Therapy

What constitutes an adequate steroid trial?

- Medrol dose pack
- 7-10 days of prednisone?
- 1 month trial of prednisone?
Sudden SNHL

 WHAT IF?
 • Severe diabetes?
   – Diet controlled
   – Oral agents
   – Insulin dependent

 WHAT IF?
 • Patient presents 4 weeks after the onset of hearing loss?
   – 6 weeks?

 WHAT IF?
 • The sudden loss occurred in an only hearing ear?
   – Treat differently?

 WHAT IF?
 • You see the patient at 2 weeks out for a second opinion and the patient was treated only with a Medrol dose pack?
Sudden SNHL

Litigation?
- For delay in delivering therapy?
- Are steroids “standard of care”?

- For complications of steroid therapy
  • AVN
  • Hyperglycemic event
  • Gastric complications

- For failure to offer IT steroids?
- For complications of IT steroids?