UNILATERAL SUDDEN SENSORINEURAL HEARING LOSS AFTER GENERAL ANESTHESIA

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Background - Sudden Sensorineural Hearing Loss

30 dB or more loss of at least three consequent audiometric frequencies occurred within the last three days. 15,000 new cases are reported annually worldwide.¹

Background-Sudden Sensorineural Hearing Loss

✓ Incidence increases with age\(^2\)
✓ No consistence of sexual predominance
✓ No seasonal variation
✓ No geographical distribution

Background - Sudden Sensorineural Hearing Loss

Possible causes are:\(^3\)

- viral infection
- vascular compromise
- disruption of cochlear membrane
- immunologic diseases
- otological tumors

Only in 10% of cases of SSHI the causes can be identified

Background-Sudden Sensorineural Hearing Loss

Infections:
✓ Inflammatory process of the inner ear-Viral causes
  ✓ 70% herpes simplex virus

Vascular:
✓ Intolerance to hypoxia → after 30 mins. Permanent damage occurs

Membrane Rupture:
✓ Rupture of the Reisner’s membrane
1. Discover and avoid potential ototoxic drugs:
   - Streptomycin, Acetyl salicilates, Gentamycin, etc

2. Control co-morbid metabolic diseases:
   - DM, CVS diseases, etc

3. Detailed audiometry must be performed in all patients

4. Routine blood tests must be performed to rule out systemic and metabolic diseases

5. MR scans (if needed) to rule out cerebellopontine angle tumors and neurological lesions
Case Report

- 36 year-old female
  - septal deviation and external nasal deformity
  - breast deformity
- Medical history
  - lipoma excision (shoulder, general anesthesia, one year ago)
- No known allergy
- Heavy smoker
- Not receiving any kind of medication
Case Report

- Preoperative evaluation
- Systemic examination
- Lab tests
- ECG
- Chest x-ray
- Blood tests were normal

NORMAL !!!
Case Report- ANESTHESIA

- **Premedication:** Midazolam 1.5 mg I.V
- **Induction:** Nitrous oxide, oxygen and remifentanyll
- **Maintenance:** Isoflurane and vecuronium bromide

- Dexamethasone 4 mg
- Metoclopramide HCL 10mg
- Cefazoline sodium 1gr

perioperatively advised by the anesthesiologist
On the third hour of the surgery, *Gentamicin 100mg I.V.*: as a routine of plastic surgery.

Total operative time was approximately five hours.
Postoperatively:

- sefazoline sodium I.V. 3g/day
- paracetamol 1500 mg/day
- xylometazoline spray
- pethidine HCL
- pantoprazole HCL I.V. 80mg/day
Case Report - Postoperative

Postoperative 1st day:

- Tinnitus + Right hearing loss
- Physical examination was normal.
- Audiogram: Right sensorineural hearing loss (average 101 dB)
Case Report- Postoperative work-up

Diagnostic work-up:
  Neurological consultation
  Lab tests
    CBC, creatinine, BUN, CRP, B12, folic acid
  Cranial MRI

NORMAL !!!
Case Report - Treatment

Pentoxifylline 600mg b.i.d + Pentoxifylline 100mg I.V. in one hour
Dextrane in isotonic NaCl solution 500cc IV in six hours
Methylprednisolone sodium succinate 80mg IV

Acetylsalicylic acid 100mg p.o.
Acyclovir 250mg q.i.d IV
Vitamin E 200IU
Vitamin B1, B6, B12 complex 250mg b.i.d.
Postoperative 2nd day:

Hyperbaric O2 treatment was started on the postoperative second day and continued for 20 sessions.

Hearing level was monitored with serial audiograms on postoperative 3rd, 6th, 8th, 13th and 24th days.

On postoperative third day pure tone air and bone conduction average in the right ear was 78dB and 63dB respectively.
Case Report- Postoperative

- Discharged on the postoperative sixth day
- During the six month follow-up, the air and the bone conduction averages recovered to 58dB and 50dB in lower frequencies
SSHL after non-otologic surgery is a rare entity and is mostly reported in association with cardiac bypass surgery. Microemboli occluding internal auditory artery is the proposed underlying mechanism of SSHL associated with cardiac surgery.  

Nitrous oxide administration during the general anesthesia may cause rapid increase in the middle ear pressure up to 450 mm/Hg. This relatively high middle ear pressure may cause cochlear membrane breaks and perilymph fistula.\textsuperscript{5,6}


In our case, perioperative administration of single dose gentamicin reminded us ototoxicity. But after detailed evaluation of clinical signs and occurrence pattern we decided that aminoglycoside ototoxicity is debatable to be the final diagnosis. Aminoglycoside ototoxicity is irreversible and auditory toxicity occurs as a result of the accumulation of aminoglycosides in the perilymph of the inner ear with subsequent damage of the sensory cells of the organ of Corti. Cochlear damage is usually permanent since cochlear hair cells do not regenerate.
In this case there are some points of interest:

If the hearing loss is due to ototoxicity, even minor doses of aminoglycosides must be avoided

We managed this case as postoperative SSHL since characteristic features of aminoglycoside ototoxicity were missing
Although improvement in hearing level was not satisfactory in our case, we believe that early detection and prompt evaluation of hearing loss may improve outcome despite the uncertainty in the etiology, the management and the prognosis.