

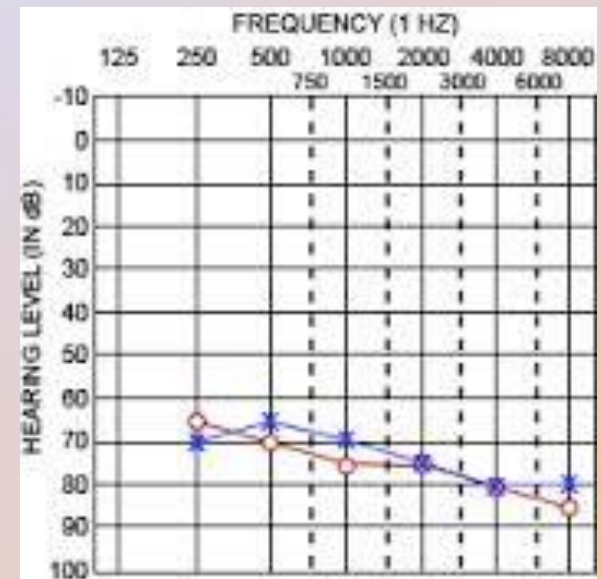
**UNILATERAL SUDDEN SENSORINEURAL HEARING
LOSS AFTER GENERAL ANESTHESIA**

**Hakan Emirkadi, MD
Department of Anesthesiology
Golcuk Military Hospital
Kocaeli / TURKEY**



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



¹ Hughes GB, Freedman MA, Hamerkamp TJ et al: Sudden Sensorineural Hearing Loss. *Otolaryngol Clin North Am* 29: 393-405



Background-Sudden Sensorineural Hearing Loss

- ✓ Incidence increases with age²
- ✓ No consistence of sexual predominance
- ✓ No seasonal variation
- ✓ No geographical distribution



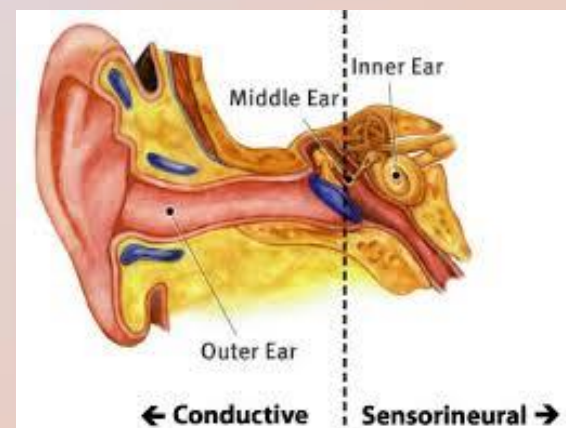


Background-Sudden Sensorineural Hearing Loss

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



³ Anderson RG, Meyerhoff WL (1983): Sudden Sensorineural Hearing Loss. *Otolaryngol Clin North Am* 16: 189-194



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

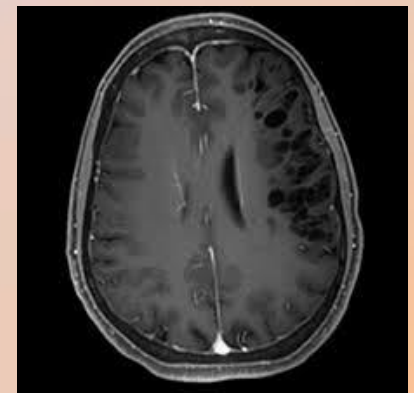
Membrane Rupture:

- ✓ Rupture of the Reissner's membrane



Background- Diagnosis

1. Discover and avoid potential ototoxic drugs:
 - ✓ Streptomycin, Acetyl salicylates, 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 remifentanyl
- ❖ Maintenance: Isoflurane and vecuronium bromide





Case Report- ANESTHESIA

❖ Nasal surgery: ENT surgeon ; Breast reduction: Plastic surgeons.

❖ Dexamethasone 4 mg

❖ Metoclopramide HCL 10mg

❖ Cefazoline sodium 1gr

perioperatively

advised by the

anesthesiologist



Case Report- ANESTHESIA

- ❖ On the third hour of the surgery,
Gentamicin 100mg I.V.: as a routine of
plastic surgery.
- ❖ Total operative time was approximately
five hours





Case Report- ANESTHESIA

Postoperatively:

sefazoline sodium I.V. 3g/day

paracetamol 1500 mg/day

xylometazoline spray

pethidine HCL

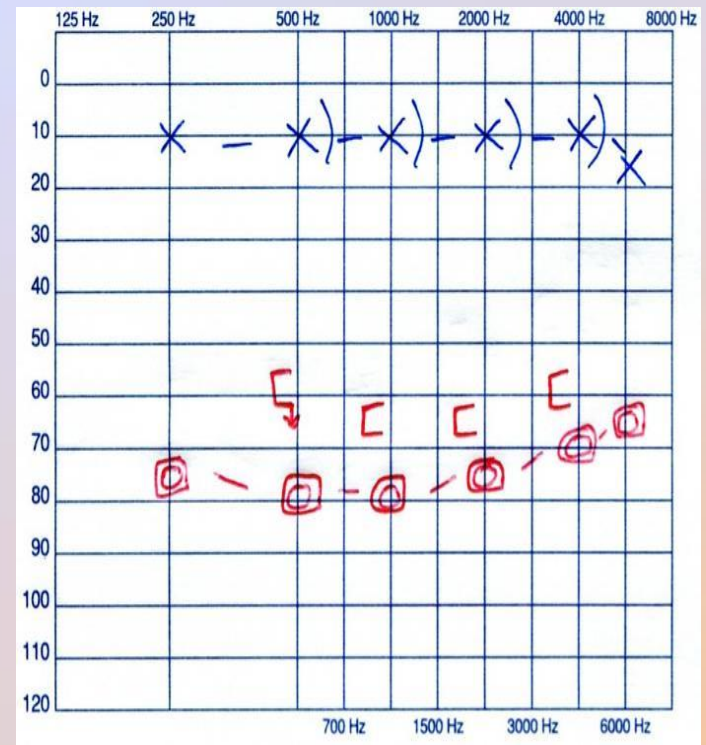
pantoprazole HCL I.V. 80mg/day

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.





Case Report- Postoperative

Postoperative 2nd day:

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

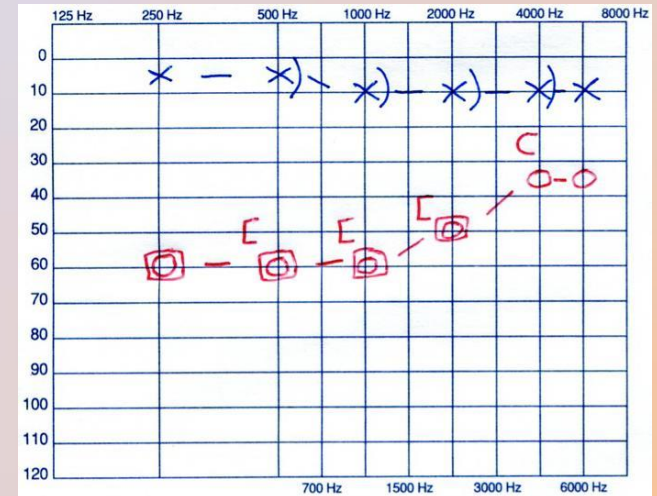
Hearing level was monitored with serial audiograms on postoperative 3rd, 6th, 8th, 13th and 24th days

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



Case Report- Postoperative

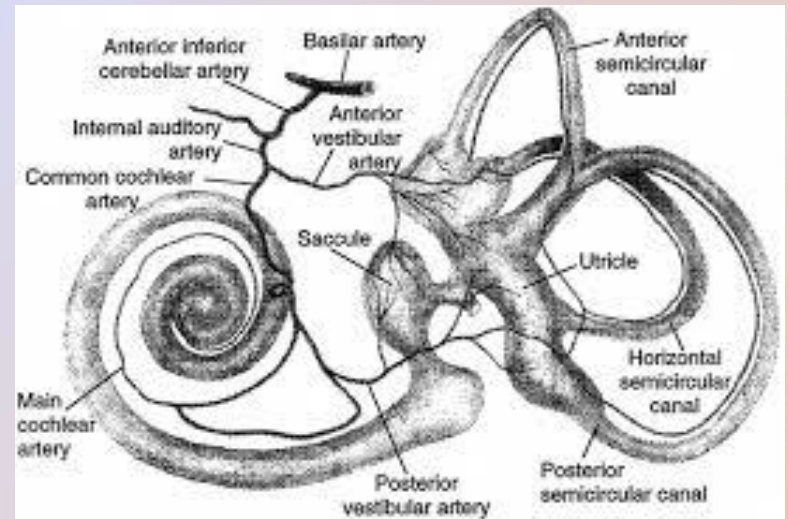
- Discharged on the postoperative sixth day
- During the six month follow-up, the air and the bone conduction averages recovered to **58dB** and **50dB** in lower frequencies





Discussion

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 SSLH associated with cardiac surgery.⁴



⁴ Walsted A, Andreassen UK, Berhelsen PG, Olesen A. Hearing Loss after cardiopulmonary bypass surgery. *Eur Arch Otorhinolaryngol* (2000) 257:124-127



Discussion

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.^{5,6}



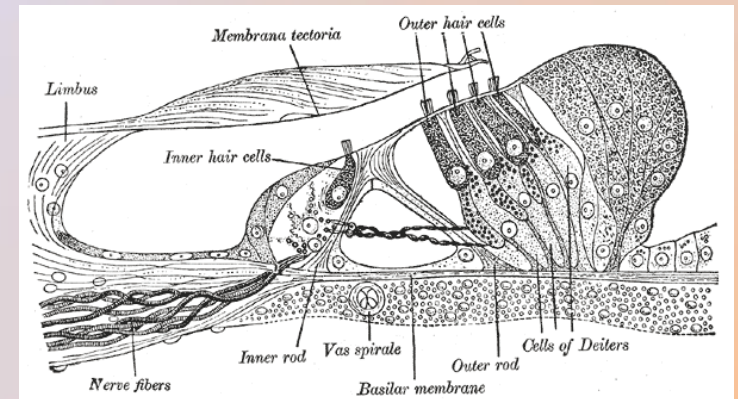
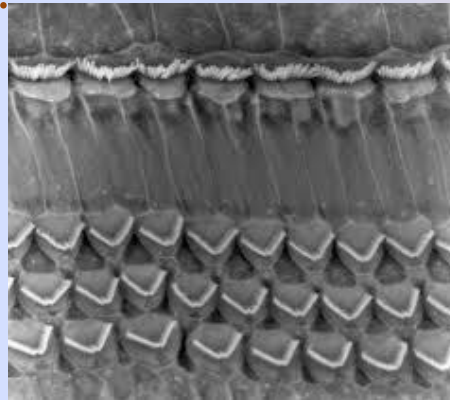
⁵ Evan KE, Tavill MA, Goldberg AN, Silverstein H. Sudden sensorineural hearing loss after general anesthesia for nonotologic surgery. *Laryngoscope* 1997 Jun; 107(6):747-52.

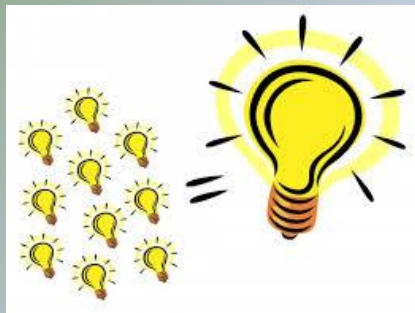
⁶ Segal S, Man A, Winerman I. Labyrinthine membrane rupture caused by elevated intratympanic pressure during general anesthesia. *Am J Otol* 1984;5(4):308-10.



Discussion

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

