



Sudden Unilateral Hearing Loss After non-Otologic Surgery

Peer review status:

No

Corresponding Author:

Dr. Nuno D Costa,
Nuno Ribeiro-Costa, Hospital Pedro Hispano, Rua Dr. Eduardo Torres. Senhora da Hora. Matosinhos, PT ,
4464-513 - Portugal

Submitting Author:

Dr. Nuno D Costa,
Nuno Ribeiro-Costa, Hospital Pedro Hispano, Rua Dr. Eduardo Torres. Senhora da Hora., 4464-513 - Portugal

Other Authors:

Dr. Diogo Abreu Pereira,
Diogo Pereira, Hospital Pedro Hispano, Rua Dr. Eduardo Torres. Senhora da Hora. Matosinhos, PT, 4464-513 -
Portugal

Dr. Paula Azevedo,
Paula Azevedo, Hospital Pedro Hispano, Rua Dr. Eduardo Torres. Senhora da Hora. Matosinhos, PT , 4464-513
- Portugal

Dr. Delfim Duarte,
Delfim Duarte, Hospital Pedro Hispano, Rua Dr. Eduardo Torres. Senhora da Hora. Matosinhos, PT, 4464-513 -
Portugal

Article ID: WMC005247

Article Type: Case Report

Submitted on: 23-Dec-2016, 11:48:00 AM GMT **Published on:** 27-Dec-2016, 07:48:47 AM GMT

Article URL: http://www.webmedcentral.com/article_view/5247

Subject Categories: OTORHINOLARYNGOLOGY

Keywords: Sudden Unilateral Hearing Loss, Otolaryngology, Surgery, Post-operative complications, Otology,
Neurotology

How to cite the article: Costa ND, Abreu Pereira D, Azevedo P, Duarte D. Sudden Unilateral Hearing Loss After
non-Otologic Surgery. WebmedCentral OTORHINOLARYNGOLOGY 2016;7(12):WMC005247

Copyright: This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC-BY\)](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Source(s) of Funding:

The authors declared that no grants were involved in supporting this work

Competing Interests:

No competing interests were disclosed

Sudden Unilateral Hearing Loss After non-Otologic Surgery

Author(s): Costa ND, Abreu Pereira D, Azevedo P, Duarte D

Abstract

A 61-year-old woman presented with sudden right-sided hearing loss with tinnitus, immediately after of laparoscopic oophorectomy. The patient is blind due to congenital retinitis pigmentosa. Physical examination revealed a normal otoscopy with tuning fork test compatible with right-sided sensorineural hearing loss. Pure tone audiograms (PTA) demonstrated right-sided sensorineural hearing loss affecting the frequencies between 250 and 1000 Hz and normal left-sided hearing. MRI of the ear and brain was normal. Treatment consisted in high-dose oral prednisolone followed by progressive withdrawal and hyperbaric oxygen therapy. PTA was repeated after the treatment and showed a partial improvement in hearing threshold, but with persistence of the tinnitus. Sudden onset sensorineural hearing loss (SSNHL) following non-otologic surgery is a rare event with frightening consequences, especially when the patient is blind.

Introduction

Sudden onset sensorineural hearing loss (SSNHL) is an ENT emergency.[1,2] It is defined as a sensorineural hearing loss of 30 dB or more in three consecutive frequencies that develops over a period of 72h.[3] Up to 90% of cases it is not possible to identify the aetiology, being considerate idiopathic.[3]

Perioperative hearing loss is a rare phenomenon, and most cases are associated with cardiopulmonary bypass or spinal anaesthesia.[4,5] However, perioperative hearing loss is often subclinical and unnoticed until audiometry is performed.[4] Although, the ear is less susceptible to acoustic trauma during general anaesthesia, other mechanisms (pharmacologic, embolism, nitrous oxide, traumatic, changes in cerebrospinal fluid) are capable of causing conductive or sensorineural hearing.[4]

Case Report

A 61-year-old women was referred to our department

after complaining of sudden right-sided hearing loss with tinnitus. Symptoms began immediately after waking up after a laparoscopic oophorectomy under general anaesthesia. The general anaesthetic involved induction with intravenous propofol, fentanyl and rocuronium. During surgery no ototoxic medication was used. The patient had history of retinitis pigmentosa that evolved to blindness bilaterally. She had no regular medication or known drug allergies. Physical examination revealed no abnormalities of the other cranial nerves and peripheral nervous system. Otoscopic examination revealed normal external auditory canals and tympanic membranes. Rinne's test was positive bilaterally and Weber's test lateralized to the left ear.

The pure tone audiograms (PTA) demonstrated right-sided sensorineural hearing loss affecting the frequencies between 250 and 1000 Hz and normal left-sided hearing (Illustration 1). The MRI of the brain and ear revealed no abnormalities in the cerebellopontine angle, internal auditory canal or inner ear.

Treatment consisted in oral prednisolone (60mg/day) for 7 days followed by progressive withdrawal. Simultaneously the patient was referred to hyperbaric oxygen therapy. The patient completed 20 sessions of 90 minutes each in consecutive days.

PTA was repeated after the treatment and showed a partial improvement in hearing threshold (Illustration 2), but with persistence of the tinnitus.

After one year, the patient denied any further improvement of her hearing, which was confirmed audiometrically. The patient also continued to refer the tinnitus in her right ear.

Discussion

SSNHL after a general anaesthesia for a non-otologic and non-cardiopulmonary bypass surgery is very rare.[4]

A recent review of the English language literature revealed only 52 reported cases of hearing loss after general anaesthesia.[6] These cases have been reported across several specialties after surgery, such as dental, ophthalmic, gastrointestinal, gynaecological, urological, orthopaedic, and endocrine surgery.[5] The

onset of the symptoms is usually immediately after the surgery. In the majority of cases the hearing loss is unilateral and affecting both high and low frequencies.[6]

Although the aetiology cannot be often established, there are a number of potential aetiologies associated with general anaesthesia, such as changes in middle ear pressure, vascular pathology, CSF pressure changes (ENT or neurosurgery), embolism, ototoxic drugs, and other miscellaneous causes.[4,7]

Excessive pressure in the middle ear in relation to ventilation with oxygen mask may cause a perilymph fistula secondary to a ruptured round window, resulting in significant hearing loss. Some anaesthetic gases, such as nitrous oxide, because of its easy dissolution and penetration on tissues, can cause oscillations of middle ear pressures that could result in a ruptured round window or tympanic membrane perforation and cause hearing loss.[4,5] However, in our case the patient didn't receive nitrous oxide during operation.

Other anaesthetic agents can have an indirect effect on the auditory system by altering the hemodynamics. In our case it was used fentanyl that causes bradycardia and hypotension and propofol that increases cerebral vascular resistance by 50% and decreases systolic blood pressure by 20-30%.[5] Beside the anaesthetics agents, the laparoscopic procedure, where the pneumoperitoneum with CO₂ produces an increase of the intra-abdominal pressure and reduction of venous return, may lead to a significant change in the hemodynamics and organs perfusion.[7] The inner ear is very susceptible to alteration changes in hemodynamics because it lacks collateral circulation and its cells have high energy metabolism. The damaged vascular epithelium causes adhesion and aggregation of the plaquets on the inner ear microcirculation, that in its turn will lead to the disintegration of the inner ear hair cells.[4]

Our patient was treated with systemic steroids (prednisolone) and complemented with hiperbaric oxygen therapy following the guidelines of sudden hearing loss from the American Academy of Otolaryngology.[3]

The prognosis is relatively good, with approximately 50% of the patients presenting at least a partial recovery.[4] Other important prognosis factors include the severity of the initial hearing loss, the presence of vertigo, age, and time from onset to initial treatment.[4,5,7]

References

- [1] Alexander TH, Harris JP. Incidence of sudden sensorineural hearing loss. *Otol Neurotol* 2013;34:1586–9. doi:10.1097/MAO.0000000000000222.
- [2] Okhovat S, Fox R, Magill J, Narula A. Sudden onset unilateral sensorineural hearing loss after rabies vaccination. *BMJ Case Rep* 2015;2015:3–6. doi:10.1136/bcr-2015-211977.
- [3] Stachler RJ, Chandrasekhar SS, Archer SM, Rosenfeld RM, Schwartz SR, Barrs DM, et al. Clinical Practice Guideline: Sudden Hearing Loss. *Otolaryngol -- Head Neck Surg* 2012;146:S1–35. doi:10.1177/0194599812436449.
- [4] Singh V, Sinha A, Madan R. Peri-Operative Hearing Impairment. *Open J Anesthesiol* 2012;2:176–7. doi:10.4236/ojanes.2012.24039.
- [5] Pau H, Selvadurai D, Murty GE. Reversible sensorineural hearing loss after non-otological surgery under general anaesthetic. *Postgrad Med J* 2000;76:304–6. doi:10.1136/pmj.76.895.304.
- [6] Punj J, Pandey R, Darlong V. Sensorineural hearing loss after general anaesthesia: 52 cases reported until now! *Anaesthesia* 2009;64:226. doi:10.1111/j.1365-2044.2008.05846.x.
- [7] Alberto R, Linares P. Hipoacusia Neurosensorial Subita Luego de Anestesia General para Colectectomia Laparoscopica Sudden Sensorineural Hearing Loss after General Anesthesia to Laparoscopic Colectectomy. *Arq Otorrinolaringol* 2005;9:320–4.

Illustrations

Illustration 1

Audiogram at presentation of right ear hearing loss. The audiogram shows a moderate to mild sensorineural hearing loss, affecting mainly the lower frequencies.

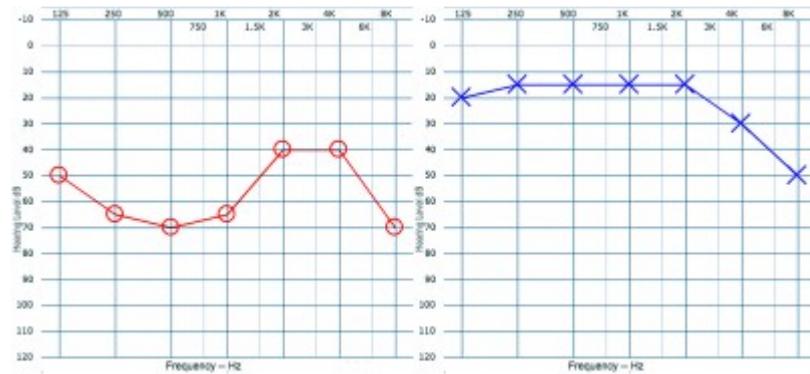


Illustration 2

Audiogram after completing treatment

