

## Case Report

### Sudden Sensorineural Hearing Loss after Spinal Anesthesia: A Case Report

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#### Abstract

**Introduction:** Hearing loss has been reported to occur after different anesthetic techniques. It is often subclinical and can easily be obscured by common symptoms such as headache, nausea and dizziness. Hearing loss after spinal anesthesia is a rare phenomenon. When it occurs, it can be unilateral or bilateral and transient or permanent.

**Case description:** We report a case of a sudden decrease in hearing since the night of surgery, which was performed under spinal anesthesia. An audiometry showed bilateral mild-to-moderate sensorineural hearing loss, which was primarily affect low and mid-frequencies. Bed rest with hydration and oral prednisolone was administered for 5 days and tapered over 5 days. Follow-up audiogram was performed daily and the patient recovered to normal hearing within a week.

**Conclusion:** Sudden sensorineural hearing loss after spinal anesthesia is a possible complication. Multiple etiologies have been proposed in the literature. Clinicians should be aware of this complication and provide prompt attention and treatment to patients complaining of headache, decreased hearing, and/or tinnitus after spinal anesthesia. We suggest informing patients about this rare complication.

**Keywords:** Anesthesia; Bilateral sensorineural hearing loss; Complication; Spinal anesthesia; Steroid; Tinnitus

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#### Introduction

Hearing loss has been reported to occur after different anesthetic techniques. It is often subclinical and can easily be obscured by other symptoms such as headache, nausea and dizziness. Therefore, audiometric evaluation is necessary for its detection. Hearing loss after spinal anesthesia is a rare phenomenon. When it occurs, it can be unilateral or bilateral and transient or permanent, and clinicians should be aware of the possibility of this adverse effect. Although the precise origin remains unclear, researchers acknowledge disruption of the endolymph/perilymph balance in the inner ear due to Cerebrospinal Fluid (CSF) leakage and decreased pressure as the mechanism underlying hearing loss after spinal anesthesia [1]. Here we report a rare case involving a 48-year-old man who developed sudden and reversible bilateral sensorineural hearing loss after spinal anesthesia.

#### Case presentation

After written informed consent has been provided by the patient to have the case details published, we report a 48-year-old man weighing 76 kg, underwent surgery for anal fissures and a fistula under spinal anesthesia. Technique was done in sitting position using pencil point needle size 25 G using hyperbaric bupivacaine 0.5% without barbotage. After surgery, he experienced a tolerable headache, which is a common side effect of spinal anesthesia. Subsequently, on the same night of surgery, he became aware of decreased bilateral hearing that worsened over time. There was no ear pain, discharge or tinnitus. The patient also complained of neck rigidity, although neurological symptoms and a decreased level of consciousness were not observed.

There were no other symptoms associated with the Ears, Nose, and Throat (ENT). The patient had no other medical history and no known allergies. Systemic examinations revealed normal findings. The patient reported no smoking or alcohol consumption history and his family history was unremarkable. His vital signs were stable.

Audio logical examinations revealed an intact tympanic membrane on both sides. An audio/tympanogram showed bilateral mild-to-moderate sensorineural hearing loss, which was primarily low and mid-frequency hearing loss. Computed tomography of the temporal bone showed a normal anatomy and no dilatation of the cochlear or vestibular aqueducts. MRI brain did not show any evidence of pneumocephalus. The anesthesia department was informed about this adverse event, and the staff did not rule out the possibility of an association with spinal anesthesia. Bed rest and adequate hydration were recommended.

In the ENT department, the patient was prescribed oral prednisolone 1 mg/kg (total 60 mg/day) for 5 days, with dose tapering over the next 5 days. Follow-up audiometry was performed daily. The patient recovered his normal hearing and showed normal audiometry findings within a week.

## Discussion

Sudden sensorineural hearing loss was defined by Wilson et al., as a 30-db sensorineural loss at 3 contiguous frequencies for > 3 days [2]. The incidence of hearing loss after spinal anesthesia is estimated to be as low as 0.4% [3-4].

The first case of hearing loss after spinal anesthesia was reported in 1914 [5]. Appropriate cerebrospinal fluid dynamics are important for maintaining balanced auditory functions within the inner ear. Hearing loss following spinal anesthesia is caused by disruption of the endolymph/perilymph balance in the inner ear as a result of decreasing pressure due to CSF leakage through the puncture site [6]. This decrease in the perilymphatic pressure results in endolymphatic hydrops due to the loss of CSF during the procedure, and postulated the resulting hypotension in the cerebrospinal space in terms of a relatively wide cochlear aqueduct, which leads to displacement of hair cells on the basement membrane with consequent low-frequency hearing loss [7]. However, in our case radiological investigation did not reveal any abnormalities in the cochlear aqueduct. The presence of bilateral hearing loss may be due to leakage of local anesthesia from CSF to the inner ear fluids.

High-frequency hearing loss is more common in elderly male patients, possibly because of their susceptibility to subtle changes in the inner ear pressure balance following CSF leakage [8]. Several studies have shown the relationship between CSF leakage and low-frequency hearing loss [3]. In addition, hemodynamic fluctuations such as hypotension may result in ischemia followed by hearing loss [8].

Some studies have reported accompanying symptoms such as tinnitus (41%-90%) and dizziness (29%-56%) during surgery under spinal anesthesia, the patient should receive adequate replacement fluids [9-12]. The management of hearing loss after spinal anesthesia is controversial, with variable results reported for CSF pressure maintenance, vasodilators, systemic steroids, hyperbaric oxygen, epidural blood patches, plasma expanders, sedatives, vitamins, and antioxidants [8]. The present patient was kept well-hydrated and in the supine position, with steroids prescribed to reduce inflammation and the endolymphatic pressure with no observed hearing level changes. Absences of vestibular symptoms as well as affection of only low and/or intermediate frequencies and young age are considered good prognostic factors.

## Conclusion

The findings from this case suggest that sudden sensorineural hearing loss after spinal anesthesia is a possible complication. Clinicians should be aware of this complication and provide prompt attention and treatment to patients complaining of headache, decreased hearing, and/or tinnitus after surgery under spinal anesthesia. Hydration, rest, and oral steroids may be beneficial for this condition. We suggest informing patients about this rare complication.

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