

Unilateral Sudden Sensorineural Hearing Loss after Spinal Anesthesia for Elective Cesarean Section: A Case Report

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Abstract

The relationship between spinal anesthesia and hearing loss is not well understood, but is thought to be due to leakages of cerebrospinal fluid, which may or may not induce postural puncture headache. Previous studies have reported no risk of hearing loss in patients under 40 or the obstetric population. We present a case of a young woman who experienced severe sudden unilateral hearing loss after spinal anesthesia for elective cesarean section. This case illustrates that young, obstetric patients may experience hearing loss after spinal anesthesia.

Introduction

Hearing loss following non-otologic surgical procedures is quite rare, and often detected only by audiometric evaluation. This phenomenon has been reported following spinal anesthesia or lumbar puncture, and can be unilateral or bilateral, typically affecting the low frequency range. An overwhelming majority of patients' hearing deficits are transient, resolving without treatment within several days. The etiology of this rare occurrence is not well understood; it is thought to be similar to that of postdural puncture headache (PDPH). Researchers hypothesize that leakage of cerebrospinal fluid from the subarachnoid space may cause a decrease in pressure transmitted to the inner ear peri lymph via the cochlear aqueduct. Here, we report the case of a young woman who suffered sudden sensorineural unilateral hearing loss after spinal anesthesia, which was not accompanied by any symptoms of PDPH.

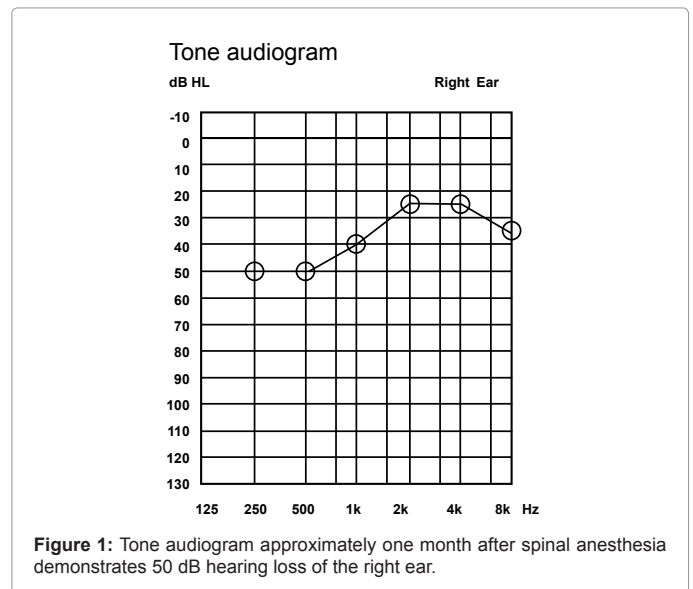
Case Report

The patient was a 30 year old healthy female who underwent a planned cesarean section due to breech presentation. The delivery was uneventful and did not require the patient to push, strain, or endure any trauma during the delivery. The c-section was performed using subarachnoid block; this required two attempts using a 24G Sprotte needle and was otherwise unremarkable. Immediately following the delivery, the patient complained of tinnitus and hearing decline. No postural puncture headache was reported. The patient had no personal or family history of hearing loss and no other contributory medical history. The obstetrician suspected that her symptoms were secondary to Eustachian tube dysfunction and a trial of a nasal steroid was initiated. The patient perceived no benefit.

Thirty-four days after her delivery the patient reported no change in her symptoms. She presented to our clinic at that time and an audiogram was performed to assess type and extent of hearing loss (Figure 1). Further work-up, including MRI of the brain and internal auditory canals were normal. Steroids were given to the patient and she had no change in her hearing levels. The option of a blood patch for a possible lumbar drain leakage was discussed, but was declined as the patient denied PDPH and it was suspected that she would not be a good candidate for epidural blood patch [1]. She returned for follow up nine months later after becoming pregnant again. She felt that her hearing had subjectively improved several months after our initial appointment, which was confirmed by audiogram at that time (Figure 2).

Discussion

Loss of hearing after spinal anesthesia for non-cardiac bypass sur-



gery has been reported and studied in the literature, but the incidence is estimated to be quite low; some report as low as 0.4% [2,3]. Because of this, very few studies have systematically investigated the phenomenon. The etiology of this occurrence is not yet well understood, but it is hypothesized that hearing loss after spinal anesthesia is due to leakage of cerebrospinal fluid which ultimately is transmitted to the peri lymph of the inner ear via the cochlear aqueduct. The resulting hearing loss has been reported to occur in the low frequency range and is typically not appreciated by the patient. In those cases in which the patient complained of hearing loss, postdural puncture headache was usually pres-

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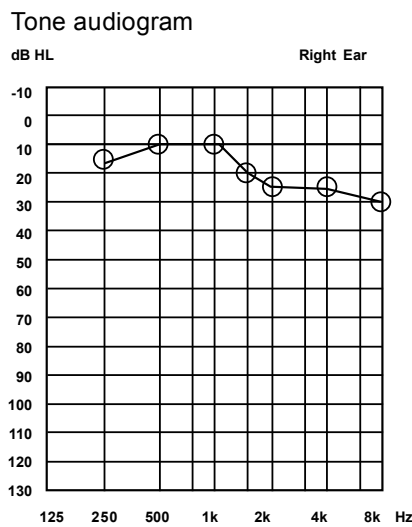


Figure 2: Approximately 9 months following spinal anesthesia, tone audiogram indicates near complete recovery of normal hearing in the right ear.

ent and no treatment was necessary. Hearing loss and other symptoms were reported as being transient, resolving spontaneously within five days of anesthesia.

Our report describes a patient who underwent a subarachnoid anesthetic block for an elective cesarean section and subsequently suffered hearing loss, which was not associated with PDPH. This is very atypical, and to the authors' knowledge, has not been reported in the literature previously. Further, her delayed recovery to near normal levels was also very atypical and has not been reported to the authors' knowledge.

While the etiology of hearing loss after spinal anesthesia has not yet been fully described, a number of studies support the hypothesis that symptoms result from a leakage of CSF, changing the pressure of peri lymph in the inner ear. It has been reported that the size of needle and its design can play a role in preventing post-anesthesia symptoms [4]; smaller gauge needles and those which employ a pencil point design are associated with decreased incidence of PDPH and hearing loss [2]. The patient we describe within was administered bupivacaine with a 24G Sprotte needle, which has been reported to be associated with the lowest risk of these symptoms. However, it is believed that a small leakage of CSF, not sufficient to induce PDPH, may be adequate to induce subclinical hearing loss. Other studies which support the hypothesis that CSF leakage has affected the pressure of peri lymph in the inner ear have reported that hearing loss symptoms were alleviated by changing the patients' position from sitting to supine [5].

Importantly, controlled trials which monitored patients' hearing by audiogram before and after spinal anesthesia have reported that young patients (those under 40 years of age) [6] and obstetric patients are not at risk of hearing loss or vestibulocochlear dysfunction following spinal anesthesia [7]. These studies also investigated the incidence of hearing loss as a result of different types and gauges of needles, concluding that even the larger, cutting-needle design would not induce enough CSF leakage to induce hearing effects. Our case illustrates that hearing loss after spinal anesthesia in a young, healthy obstetric patient is indeed possible, and that CSF leakage cannot be ruled out as the cause of this dysfunction.

Considering the hypothesis which might describe why one's hear-

ing is affected by spinal anesthesia, it is somewhat surprising that some patients such as ours experience unilateral hearing loss. Other authors have suggested that this is due to cochlear patency, such that the pressure change cannot be transmitted to the peri lymph unless the cochlear aqueduct is particularly patent [8,9]. In fact, one study specifically excluded patients who did not present with a patent cochlear aqueduct when investigating the correlation between tympanic membrane displacement and hearing loss [10].

No treatment currently exists for sudden unilateral hearing loss after spinal anesthesia. The etiology is unknown but suspected to be related to a patent cochlear aqueduct. Though some studies report no risk to younger patients or obstetric patients, our case illustrates that some risk does in fact exist for these populations. Most cases are transient and resolve spontaneously without treatment; those cases which do not improve without treatment have been reported in the literature to be accompanied by postdural puncture headache. These cases have been reportedly treated by epidural blood patch with great success. However, the effectiveness of such treatment is questionable in a case in which PDPH is not also present [1]. Since it is not possible at this time to anticipate which patients are at highest risk of developing otologic complications after spinal anesthesia, prompt attention should be given to any patient complaining of hearing loss or tinnitus following a spinal anesthetic.

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