



## CASE REPORT

# Isolated bilateral tinnitus after spinal anesthesia: A case report

## Spinal anestezi sonrası izole bilateral tinnitus: Olgu sunumu

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### Summary

Rarely, endolymphatic hydrops may occur after spinal anesthesia due to the perforation of the dural membrane and a decrease in cerebrospinal fluid pressure. Consequently, auditory complications such as tinnitus and hearing loss may arise. Tinnitus can be accompanied by headache and hearing loss. In this case report, isolated bilateral tinnitus, which occurred in the early intraoperative period and spontaneously regressed in a patient who underwent bilateral tubal ligation under spinal anesthesia, is presented.

Keywords: Anesthesia, spinal; ligation, tubal; tinnitus.

### Özet

Spinal anestezi sonrasında nadiren dural membranın delinmesi ve beyin omurilik sıvısı basıncının azalması sonucunda endolenfatik hidrops meydana gelebilir. Bu durum, tinnitus ve işitme kaybı gibi işitsel komplikasyonlara yol açabilir. Tinnitusa baş ağrısı ve işitme kaybı eşlik edebilir. Bu olgu sunumunda, spinal anestezi altında bilateral tüp ligasyonu operasyonu geçiren hastada, intraoperatif erken dönemde ortaya çıkan ve spontan olarak gerileyen izole bilateral tinnitus sunulmuştur.

Anahtar sözcükler: Anestezi; spinal; ligasyon, tüp; tinnitus.

### Introduction

Tinnitus is defined as sound perceived in the ears or head without an acoustic stimulus. It originates from the word “tinnire” and means ringing.<sup>[1]</sup> It may be unilateral or bilateral, temporary or permanent.<sup>[2]</sup>

Although the formation mechanism cannot be fully explained, different theories have been proposed. The most widely accepted hypothesis is that it occurs due to decreased intralabyrinthine pressure. The cochlear duct provides an anatomical connection between the cochlea and the subarachnoid space. The composition of perilymph in the cochlea is very similar to cerebrospinal fluid. It has been suggested that decreased cerebrospinal fluid pressure causes a decrease in intralabyrinthine

pressure, causing functional insufficiency in the ear in transmitting sounds. Thus, problems such as tinnitus and hearing loss may occur.<sup>[2,3]</sup> Auditory symptoms such as tinnitus are rarely described in the literature after neuraxial anesthesia. It may be accompanied by headache, nausea, vomiting, and rarely vision loss. It has been reported that symptoms may relieve spontaneously or become chronic, and when they become chronic, patients benefit from an epidural blood patch.<sup>[3,4]</sup>

In this case report, isolated bilateral tinnitus that occurred in the early intraoperative period and spontaneously regressed in a patient who underwent bilateral tubal ligation under spinal anesthesia is presented.

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## Case Report

A bilateral tubal ligation operation was planned for a thirty-two-year-old, 70 kg, 165 cm tall patient with three children. The patient had no history of systemic disease and was a smoker. His laboratory values were within normal limits. The patient was informed about spinal anesthesia, and his consent was obtained.

After standard anesthesia monitoring (non-invasive blood pressure, heart rate, pulse oximetry, and electrocardiogram), vascular access was established with a 20 G cannula. Fluid resuscitation with isotonic solution was started on the patient, whose vital signs showed no abnormality. Following premedication with intravenous 1 mg midazolam, the subarachnoid space was entered at once from the L3-L4 intervertebral space with a 25 G Quinke spinal needle after the necessary antiseptic cleaning in the sitting position. After observing clear cerebrospinal fluid (CSF) flow, spinal anesthesia was performed with 10 mg bupivacaine heavy (Buvasin 0.5% Spinal Heavy, Vem Pharma, Türkiye) and 25 µg fentanyl (Fentanyl-PF, Polipharma, Türkiye) in a 2.5 mL local anesthesia solution. After the procedure, the patient's vital signs were within normal limits, and his head was elevated. The operation was started after the sensory block level reached T6 and the motor block level was Bromage 3.

Half an hour after the start of the operation, the patient developed tinnitus in both ears, but there was no hearing loss, headache, nausea, or vomiting. Blood pressure was 85/60 mmHg, and heart rate was 78 beats per minute. The patient's crystalloid fluid resuscitation was increased. During the operation, which lasted approximately one hour, 2000 mL of crystalloid fluid was transfused to the patient. No intraoperative nausea, vomiting, headache, or other complaints were observed in the patient, whose tinnitus continued until the operation's end. The hemodynamic parameters of the patient, who was taken to the recovery unit at the end of the operation, were within normal limits, and fluid resuscitation continued. A total of 3000 mL of fluid was transfused to the patient, who was monitored for half an hour postoperatively. The patient's sensory block level decreased to T10, and his tinnitus decreased spontaneously. The patient, who had no complaints, was trans-

ferred to the inpatient service. The Ear Nose Throat Department consulted the patient, who had no auditory complaints, and no pathology was found. The patient, evaluated at the 6<sup>th</sup> and 24<sup>th</sup> postoperative hours, had a minimal headache (Visual Analog Scale=2). No complaints related to tinnitus, hearing loss, or vision were observed. The patient was advised to drink plenty of fluids, have bed rest, and consume caffeinated drinks, and was discharged.

The patient was informed about the case presentation, and written and verbal consent was obtained.

## Discussion

Sensorineural hearing loss and tinnitus have been reported after general and spinal anesthesia.<sup>[5-7]</sup> The incidence of auditory complaints may vary depending on the diameter of the spinal needle used, whether it is sharp or pencil-point, and the amount of CSF leak. The use of a sharp-tipped spinal needle increases post-dural puncture headaches as well as auditory complications after spinal anesthesia.<sup>[8,9]</sup>

It has been reported that hearing loss after spinal anesthesia is detected in 52% of young patients and 6% of elderly patients, and in addition, auditory complications are more common in the young age group.<sup>[3]</sup> Although the incidence of auditory complications is 42%, hearing loss and tinnitus have a low incidence of 0.8% to 3%.<sup>[10]</sup> It has been stated that the bleeding and fluid replacements occurring in patients are not directly related to tinnitus but are related to low-frequency hearing loss. Yıldız et al.<sup>[11]</sup> reported that hearing loss was higher in patients who underwent fluid loading with crystalloid than in patients who underwent fluid loading with colloid, although there was no significant difference.

Postdural puncture headache treatment includes conservative treatments and invasive treatment protocols. Conservative treatments include bed rest, hydration, and pharmacological therapy. Pharmacological treatment usually begins with oral analgesics such as acetaminophen. It is recommended to consume oral or parenteral caffeinated preparations or caffeinated drinks if they are insufficient. Since decreased CSF pressure is the basis of post-spinal auditory complications, conservative approaches should be tried first in patients. An epidural blood patch is

accepted in cases where conservative treatment fails due to its high success rate and easy application. It is a safe and effective application with infrequent significant side effects. Güngör et al.<sup>[3]</sup> reported that vestibulocochlear disorder accompanied by severe headache was observed after a single dural puncture, and the patient's complaints were resolved with an epidural blood patch. Günaydın et al.<sup>[8]</sup> reported that sensorineural-type hearing loss accompanied by unilateral tinnitus on the second day after applying combined spinal-epidural anesthesia, and the complaints resolved spontaneously after 19 days.

Auditory disorders after dural puncture usually occur in hearing loss and tinnitus accompanied by headache. Although hearing loss is usually temporary, cases lasting more than two years have also been reported.<sup>[12]</sup> Hearing losses generally occur at low frequencies (125–1000 Hz) within an average of 2 days after dural puncture and resolve within one week. Accompaniment of tinnitus, headache, nausea, or vomiting may cause the condition to be masked.<sup>[10,12]</sup> Isolated tinnitus, which occurs early after dural puncture and resolves spontaneously in a short time, such as 1–2 hours, as in our case, is not typical. The mild hypotension observed in the patient was quickly resolved with crystalloid fluid resuscitation, and colloid fluid replacement was not performed. The absence of headache, nausea, and vomiting made recognizing tinnitus easier for the patient. Risk factors in our case can be shown as young age, use of sharp-tipped needles, and female gender.

In conclusion, auditory disorders such as tinnitus and hearing loss may occur after spinal anesthesia. Headache, nausea, and vomiting accompanying tinnitus can mask auditory problems. Conservative approaches should be considered initially in treatment. Fluid resuscitation should be planned aggressively with crystalloids and colloids. Epidural blood patches should be considered for treating auditory disorders that do not respond to conservative approaches.

**Informed Consent:** *Written informed consent was obtained from the patient who participated in this study.*

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