



An Epidural Blood Patch Relieves Unilateral Postdural Puncture Tinnitus in a Post-Caesarean Section Parturient

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A 30-year-old healthy parturient developed left-side tinnitus without headache, and also other auditory symptoms, immediately after spinal anesthesia (SA) for Caesarean section. Symptoms persisted for three days. Treatment with an epidural blood patch (EBP) via the previous lumbar puncture site completely relieved symptoms. Tinnitus has been reported following cerebral spinal fluid (CSF) leakage in patients who underwent lumbar puncture, SA, myelography, and some other neurological interventions. Postdural puncture CSF leakage most often manifests as a postdural puncture headache (PDPH). Hearing loss has also been reported. The PDPH may usually be treated with an EBP. In the present report, the response of tinnitus to an EBP suggests that the cause of tinnitus was probably CSF hypovolemia, as this is the cause of PDPH and hearing loss. An EBP is a good choice for the management and differential diagnosis of severe tinnitus resulting from intracranial hypotension after dural puncture.

Key words: postdural puncture, tinnitus, epidural blood patch

INTRODUCTION

Tinnitus is a manifestation of malfunction in the processing of auditory signals and involves both perceptual and psychological components. Tinnitus is often associated with sensorineural hearing impairment¹. Severe tinnitus greatly distresses patients and may lead to suicide². The mechanism remains poorly understood. Tinnitus, usually occurring bilaterally and associated with hearing loss, is a rare complication (incidence 0.3-8%) after spinal anesthesia (SA)^{3,4}. Postdural puncture headache (PDPH), tinnitus and hearing loss have been successfully treated by epidural blood patches (EBPs) in clinical practice after SA⁵⁻⁸. In this report, we present a case of unilateral tinnitus after SA, and report that an EBP successfully relieved the symptom.

CASE REPORT

A 30-year-old ASA I female patient, weight 62 kg and height 164 cm, was admitted in labor at 38 and 6/7 weeks gestational age. A Caesarean Section (CS) was performed as the woman had received an earlier CS. After 500 ml of lactated Ringer's solution was given intravenously for prehydration, a 25-G Quincke needle was inserted at the L₄₋₅ interspace, with two punctures, for SA. Ten milligrams of tetracaine was given intrathecally with the sensory block to the T4 level. A healthy male infant was delivered. Apgar scores of nine were recorded at one minute and again at five minutes after delivery. The operation was completed uneventfully within 45 min. The estimated blood loss was 500 ml while the total fluid administration was 1500 ml of lactated Ringer's solution, including the prehydration 500 ml. The patient complained of left side tinnitus, without cephalgia, vertigo, dizziness, hearing loss and nausea, six hours after delivery. The tinnitus was not posture related. Bed rest and hydration with normal saline (2500 ml daily for two days) were in vain. The authors were consulted for further management. Audiometry showed no hearing loss. No definitive etiology of tinnitus was found and the symptom persisted for another day. The tinnitus greatly distressed the patient and disturbed her sleep. She requested immediate relief. We therefore recommended an EBP. After patient consent was obtained, EBP was per-

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formed at the L₄₋₅ level with 12 ml of autologous blood. Three hours later, the patient felt much better. Tinnitus was completely relieved eight hours later and did not return. The patient was discharged four days after CS.

DISCUSSION

This case illustrates that unilateral tinnitus can be a solitary symptom of the postdural puncture syndrome and that an EBP can effectively relieve the symptom. Tinnitus is usually associated with a disorder in the auditory system affecting the ear, the auditory nerve, central perception or the interpretation of sound. Tinnitus can cause tension, frustration, anger, depression, sleep disturbance and loss of concentration. In some people, this can lead to a state of constant anxiety and fearful attention to the tinnitus. An understanding of this is important, and appropriate counseling, support and treatment are usually needed.

Tinnitus is a possible complication after spinal dural puncture. Other complications include headache, neck pain, hematoma, nausea, vomiting, vertigo, dizziness and hearing loss⁴. These complications are caused mainly by leakage of cerebral spinal fluid (CSF) through the puncture hole on the dura mater, thus reducing CSF pressure and volume within the dural sac⁵⁻¹⁰. Tinnitus has been reported as a symptom associated with CSF hypovolemia^{11,12} and spontaneous intracranial hypotension¹³. Postdural puncture tinnitus may thus occur due to CSF hypovolemia or hypotension after CSF leakage. As an EBP has been reported to relieve tinnitus accompanied by PDPH and hearing loss, we suggest that tinnitus, PDPH and hearing loss may share the same cause. The direct connection between CSF and the perilymph, via the cochlear aqueduct, may be relevant to hearing loss and tinnitus after SA. CSF leakage may decrease CSF pressure, indirectly reducing perilymph passage through the cochlear aqueduct. Endolymphatic and perilymphatic pressures will then also change^{6,14-16}. Tinnitus and hearing loss may result.

Patients with unilateral tinnitus are more likely than those with bilateral tinnitus to have serious underlying disease and typically merit referral to an otolaryngologist. Unilateral tinnitus can be caused by cerumen impaction, otitis externa, otitis media, glomus or cerebellopontine angle tumor, and acoustic tumor¹⁷. In our present report, the unilateral tinnitus was not due to any of these causes. Unilateral hearing loss after SA, and treatment with an EBP, has been reported previously¹⁸, but it was unclear why the tinnitus was unilateral and not bilateral. Unilateral postdural puncture tinnitus may be due to lateral rotation of the neck or a lateral decubitus position of the body leading

to greater CSF hypotension in the upper ear compared to the lower. Further studies are needed.

Gormley first used an EBP, with autologous blood injected into the epidural space close to the puncture site, and found dramatic relief of PDPH in patients¹⁹. An EBP has also been employed successfully to relieve chronic tinnitus⁷ and hearing loss⁵⁻⁸, intractable vomiting²⁰, and even postdural puncture thoracic pain without headache²¹. The mechanism of EBP administration involved simple plugging of the thecal tear and provision of a tamponade effect on CSF displaced from the cranial cavity¹⁰.

Our patient suffered from sleep disturbance and anger. The planned hospital discharge time was also delayed. The patient requested relief of tinnitus as soon as possible. As permanent sensorineural hearing loss⁸ and chronic headache²² after late management of postdural puncture leakage has been reported previously, and as we could find no other obvious cause of her tinnitus, we administered an EBP urgently as we suspected that neurologic complications related to postdural puncture CSF leakage were developing. After the EBP was applied tinnitus ceased.

In summary, we suggest that postdural puncture CSF leakage after SA is the reason for solitary unilateral tinnitus in patients who have no previous tinnitus history. Prompt intervention with an EBP permitted differential diagnosis and immediate satisfactory symptom relief. The patient became calm and long-term sensorineural sequelae were avoided. An EBP, then, is useful not only for PDPH, hearing loss and chronic tinnitus but also for tinnitus occurring after lumbar puncture. However, disorders of the middle ear, cochlea or auditory nerve must be ruled out before conservative noninvasive treatment (still the first choice) is replaced by an EBP.

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