

Cochlear microphonic potential

The “cochlear” aqueduct is a narrow channel connecting the subarachnoid and intralabyrinthine spaces. Through this communication, cerebrospinal fluid (CSF) pressure variations are transmitted to the intralabyrinthine space and modify the impedance of the ear. Distortion-product otoacoustic emissions (DPOAE) are sounds emitted by cochlear sensory cells in response to sonic stimulation. Cochlear microphonic potentials (CMP) express the electrophysiological activity of cochlear sensory cells. At 1 kHz, the phase of DPOAE and CMP varies according to the impedance of the ear and thus to intracranial pressure (ICP) variations. DPOAE and CMP have been shown to strictly follow ICP variations produced during infusion tests performed in the diagnosis of chronic hydrocephalus. DPOAE and CMP recordings appear to be valuable tools for monitoring ICP non-invasively ¹⁾.

In [vestibular schwannoma surgery](#), [hearing preservation](#) rate remains low. Besides damage to the [cochlear nerve](#), intraoperative cochlear ischemia is a potential cause of hearing loss.

Lourenço et al. used non-invasive cochlear microphonic (CM) recordings to detect the cochlear vascular events of VS surgery. Continuous intraoperative CM monitoring, in response to 80-95 dB SPL, 1-kHz tone-bursts, was performed in two samples of patients undergoing retrosigmoid cerebellopontine-angle surgery: one for VS (n = 31) and one for vestibular neurectomy or vasculo-neural conflict causing intractable trigeminal neuralgia, harmless to hearing (n = 19, control group). Preoperative and postoperative hearings were compared as a function of intraoperative CM changes and their chronology. Monitoring was possible throughout except for a few tens of seconds when drilling or suction noises occurred. Four patterns of CM time course were identified, eventless, fluctuating, abrupt or progressive decrease. Only the VS group displayed the last two patterns, mainly during internal-auditory-canal drilling and the ensuing tumor dissection, always with postoperative loss of hearing as an end result. Conversely, eventless and fluctuating CM patterns could be associated with postoperative hearing loss when the cochlear nerve had been reportedly damaged, an event that CM is not meant to detect. Cochlear ischemia is a frequent event in VS surgery that leads to deafness. The findings that CM decrease raised no false alarm, and that CM fluctuations, insignificant in control cases, were easily spotted, suggest that CM intraoperative monitoring is a sensitive tool that could profitably guide VS surgery ²⁾.

1)

Sakka L, Thalamy A, Giraudet F, Hassoun T, Avan P, Chazal J. Electrophysiological monitoring of cochlear function as a non-invasive method to assess intracranial pressure variations. *Acta Neurochir Suppl.* 2012;114:131-4. doi: 10.1007/978-3-7091-0956-4_24. PubMed PMID: 22327678.

2)

Lourenço B, Madero B, Tringali S, Dubernard X, Khalil T, Chays A, Bazin A, Mom T, Avan P. Non-invasive intraoperative monitoring of cochlear function by cochlear microphonics during cerebellopontine-angle surgery. *Eur Arch Otorhinolaryngol.* 2017 Oct 27. doi: 10.1007/s00405-017-4780-8. [Epub ahead of print] PubMed PMID: 29080147.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

https://neurosurgerywiki.com/wiki/doku.php?id=cochlear_microphonic_potential

Last update: **2025/04/29 20:29**



