Cochlear implant

- Music Abilities and Speech Perception in Indian Pediatric Cochlear Implant Users: A Comparative Study
- The 3D-Robotic Exoscope Compared With the Microscope in Cochlear Implant and Translabyrinthine Surgery
- Clinico-radiological predictors of facial palsy incidence after transcanal cochlear implantation: an ambispective multicenter study
- Validating the Iowa Test of Consonant Perception in a large cohort of cochlear implant users
- Audiometric Outcomes of Auditory Brainstem Implantation during Vestibular Schwannoma Resection in NF2 Patients
- Leveraging eCAP thresholds in a logistic model to predict speech outcomes after implantation in anomalous cochlea
- Clinical severity grading of NF2-related schwannomatosis
- Rare case of cochlear implant damaged by nearby use of monopolar electrosurgery

A cochlear implant is an electronic medical device developed for people with severe to profound perceptive hearing loss who have limited benefits from appropriately fitted hearing aids. Hearing aids capture sound, amplify it and send it through the normal auditory channel. They are designed for people with slight to moderately severe perceptive hearing loss. In cases of severe to profound hearing loss, hearing aids are not powerful enough. If the ear damage is too severe, amplifying sound using a traditional hearing aid will have no effect. The cochlear implant overcomes this by sending the signal directly to the auditory nerve. Unlike traditional hearing aids, cochlear implants bypass the damaged areas of the ear. They capture the sound, process it and electrically stimulate the auditory nerve.

Parts

The cochlear implant system consists of two parts:

• The internal part (A) is a receiver surgically implanted in the temporal bone underneath the skin, and an electrode array placed in the cochlea.

• The external part (B) is a behind-the-ear sound processor and a lead connecting the processor to the antenna. The antenna is magnetically attached to the skin over the internal part.

Auditory brainstem implants have failed to produce consistent clinical results comparable to those with the cochlear implant, both with surface and penetrating electrodes.

A 38-year-old male who presented with progressive hearing loss, resulting in profound bilateral hearing loss. He had a past history of childhood medulloblastoma, which was treated with posterior fossa craniotomy and radiotherapy. A ventriculoperitoneal shunt was put in place to manage the hydrocephalus. Cochlear implantation (CI) was carried out on his right ear by a standard procedure. At CI activation, the electric impedance of the electrode was very high, and computed tomography

revealed that there was no area of liquid density, suggesting depletion of the perilymph in the cochlea and vestibule. Eight months later, the impedance improved gradually, and the cochlea was filled with perilymph. Consequently, one of the causes of the pneumolabyrinth in the present case was that a scarred stenotic cochlear canaliculus secondary to surgery or radiation therapy might have prevented the CSF from filling the scala. In addition, it is also possible that the VP shunt might have altered the CSF pressure, leading to depletion of the perilymph [1)].

Books

Cochlear Implants-Basic Textbook [2)]

1)
Moteki H, Fujinaga Y, Goto T, Usami SI. Pneumolabyrinth, intracochlear and vestibular fluid loss after cochlear implantation. Auris Nasus Larynx. 2018 Oct;45(5):1116-1120. doi: 10.1016/j.anl.2018.03.004. Epub 2018 Apr 19. PubMed PMID: 29680680.
2)
Arriaga M. Book Review: Cochlear Implants-Basic Textbook, Sandro Burdo, Arestampa Srl, Varese Italy, 2023. Otol Neurotol. 2024 Dec 1;45(10):1097. doi: 10.1097/MAO.0000000000004348. PMID: 39607993.