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Deafness after bacterial meningitis: cause or consequence?

Surdez após meningite bacteriana: causa ou consequência?

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Keypoints

What is known

- Sensorineural hearing loss is a possible consequence of bacterial meningitis.
- Inner ear malformations can increase the risk of recurrent central nervous system infections.
- Cochlear implantation is challenging in cases of common cavity inner ear malformation.

What is added

- This case highlights the role of early pediatric referral for post-meningitic auditory assessment.
- Bone-anchored hearing implants are a viable alternative when cochlear implantation is not feasible.

Sensorineural hearing loss is a possible consequence of bacterial meningitis, and its early detection relies on national guidelines recommending auditory screening during or shortly after hospitalization. Additionally, inner ear malformations can cause unilateral or bilateral congenital sensorineural hearing loss and, in some cases, can increase the risk of central nervous system infections[1,2].

A seven-year-old boy was referred to otolaryngology following hospitalization for pneumococcal meningitis. His parents expressed mild concerns about hearing, but physical examination and personal/family history were unremarkable. Information on the patient's neonatal hearing screening could not be obtained.

An audiometric assessment revealed profound right-sided sensorineural hearing loss with normal contralateral hearing (Fig. 1). Post-meningitic sensorineural hearing loss was suspected. Congenital inner ear defects can predispose children to recurrent meningitis due to CSF leaks, reinforcing the need for imaging studies[3].

An urgent temporal bone CT revealed a right-sided inner ear malformation with a common cavity deformity involving the cochlea, vestibule and lateral semicircular canal. The superior and posterior semicircular canals were dysplastic, and cochlear partitioning was abnormal, with a patent cochlear opening communicating with the subarachnoid space (Fig. 2). The left ear was normal. This rare anomaly often complicates cochlear implantation due to anatomical challenges[4].

Given this malformation, a bone-anchored hearing implant soft band trial was performed with favorable results, leading to successful implantation. In fact, bone-anchored hearing implants have been reported as an effective alternative in cases where cochlear implantation is not feasible due to structural abnormalities[5].

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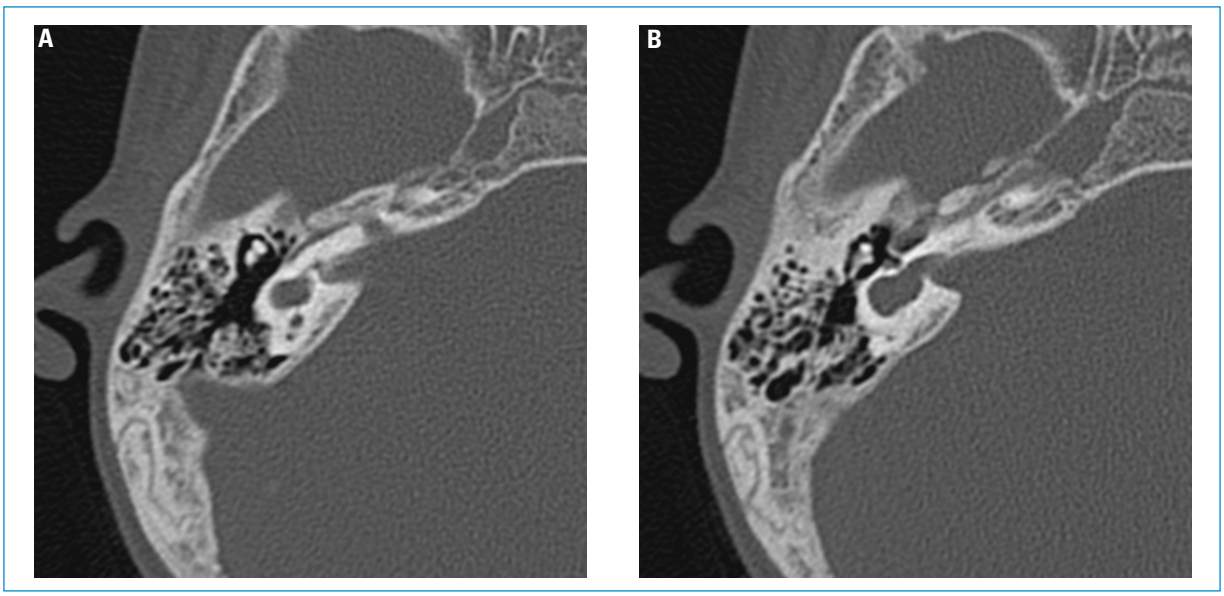

Figure 1. **A** and **B**: CT scan (axial) of the right temporal bone showing a common cavity malformation involving an abnormal cochlear partition and communication between the subarachnoid space and perilymph.

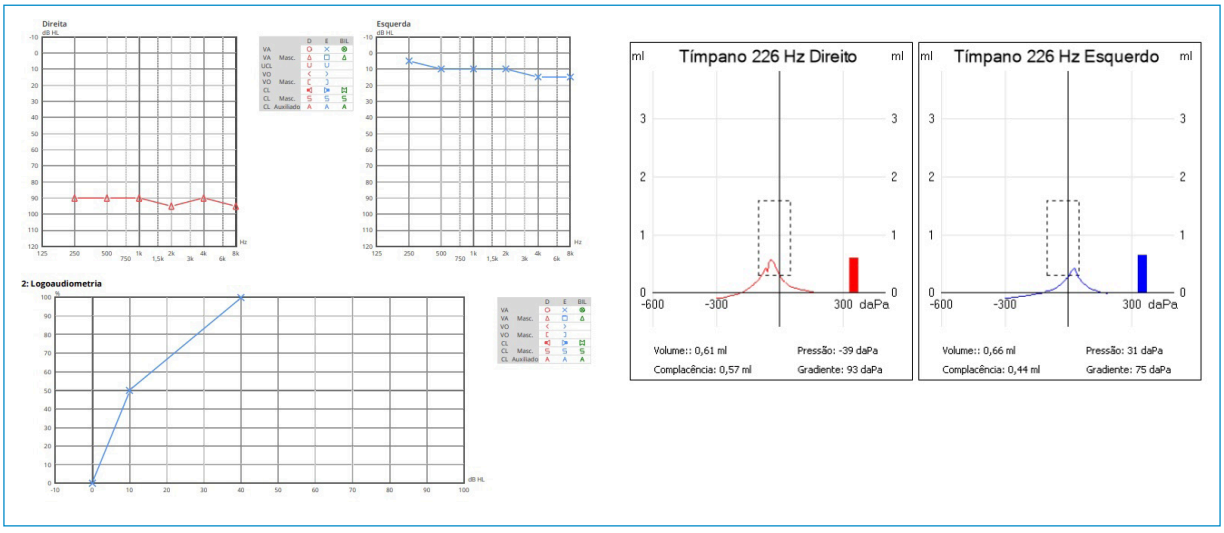

Figure 2. Pure-tone audiogram and tympanogram showing profound right-sided sensorineural hearing loss and preserved hearing in the left ear and normal tympanogram.

Inner ear malformations can cause both sensorineural hearing loss and an increased risk of meningitis. Common cavity deformity is a rare congenital labyrinthine anomaly associated with profound hearing loss. Cochlear implantation often has limited success, whereas in this case, a bone-anchored hearing implant was selected for auditory rehabilitation with good results[4]. This was only an option because the contralateral hearing was normal.

Although cochlear implantation is generally recommended for children with profound hearing loss, the presence of a common cavity abnormality, as seen in this case, posed significant anatomical challenges and increased the risk of complications. Given the surgical risks involved, the parents preferred the bone-anchored solution over cochlear implantation.

This case reinforces the need for timely referral to otolaryngology, which enables multidisciplinary hearing loss management. Furthermore, post-meningitic auditory screening should be emphasized as a key step for early detection of sensorineural hearing loss and prompt referral for audiological and imaging assessments.

Author contributions

J. Ida Dias: conceptualization, drafting of the manuscript; R. Carvalho: data collection and conceptualization. S. Castro and Miguel Coutinho: critical review and drafting of the manuscript

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Conflicts of interest

None.

Ethical considerations

Protection of people and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The authors followed their institution's confidentiality protocols, obtained informed consent from the patients, and have approval from the Ethics Committee. The recommendations of the SAGER guidelines were followed, in accordance with the nature of the study.

Statement on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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