

N° 7502

AUDITORY OUTCOMES IN POST-MENINGITIS COCHLEAR IMPLANTATION

Hugo Barcelos Figueiredo, Sofia Chaves, Francisca Bartolomeu, Marta Lopes, João Eloi, Sofia Paiva, Jorge Miguéis

Otolaryngology Department, Unidade Local de Saúde de Coimbra, Praceta Professor Mota Pinto, 3004-561 Coimbra, Portugal

sofiachaveschuc@gmail.com

BACKGROUND

Post-meningitic sensorineural hearing loss primarily affects the cochlea rather than the cochlear nerve, contrary to past beliefs. The cochlear duct may act as a conduit for infection spread from the subarachnoid space into the scala tympani, initiating osteoneogenesis through endosteal inflammatory response. The most frequent pathogens are *Streptococcus pneumoniae* and *Neisseria meningitidis*. Cochlear ossification and fibrosis can complicate implantation, hence the importance of early diagnosis and intervention.

OBJECTIVE

To evaluate the association between meningitis-related variables (etiology, age at diagnosis, age at cochlear implantation, time between diagnosis and implantation) and post-implant auditory rehabilitation outcomes.

METHODS

This was a retrospective, observational study conducted in the Otolaryngology Department of ULS Coimbra. Clinical records from 1985 to 2024 were analyzed. Patients with profound sensorineural hearing loss post-meningitis who underwent cochlear implantation were included (n=63). Outcomes were compared across age at diagnosis (<6 months, 6–12 months, 1–2 years, >2 years), age at implantation (≤3 years, >3 years), and implantation timing (<1 year, 1–3 years, >3 years post-diagnosis). Statistical analysis included Mann-Whitney U, Kruskal-Wallis, and Chi-square tests (p<0.05).

RESULTS

The majority of infections were of unknown etiology; among known cases, *Streptococcus pneumoniae* predominated. Earlier implantation (≤3 years) was significantly associated with improved outcomes in disyllabic word recognition (70/80 dB), monosyllables, numbers, and telephone use (p<0.01). Pediatric patients outperformed adults across multiple measures, likely due to higher brain plasticity and shorter auditory deprivation. Time elapsed between diagnosis and implantation also affected results, with better performance in those implanted within 3 years.

CONCLUSIONS

Cochlear implantation after meningitis yields better outcomes when performed at a younger age and within a shorter time after diagnosis. Children generally perform better than adults. These findings reinforce the importance of early diagnosis and prompt surgical referral in post-meningitic deafness.

SUPPORTING DATA FROM LITERATURE AND PRESENTATION

Literature and institutional data further support the study findings. Around 34% of post-meningitic patients show cochlear fibrosis or ossification, potentially hindering electrode insertion. These structural changes highlight the urgency of early implantation.

Auditory outcomes correlate negatively with implantation delay and older age at surgery. Pediatric patients (<18 years), especially those implanted before 3 years of age, consistently show superior performance across speech discrimination tasks, including monosyllables, numbers, disyllables at

70/80 dB, and telephone use. Adults, particularly those deafened in childhood but implanted later, display significantly poorer results.

Early implantation appears to mitigate ossification and leverages neuroplasticity for improved outcomes. These findings reinforce the clinical approach favoring early detection and intervention.