COCHLEAR IMPLANTATION IN CHILDREN: THE RISK OF PNEUMOCOCCAL OTITIS MEDIA

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Pneumococcal otitis media is most frequent in young children and is a matter of concern in cochlear implantation. In the course of the implantation surgery, the physiological barrier between the middle ear and inner ear is broken down by incising the round window membrane or by fenestration of the cochlear wall. It is feared that the insertion of an electrode array into the scala tympani could provide a pathway for microorganisms and toxins to enter the cochlea, resulting in labyrinthitis. To assess the actual risk of secondary inner ear infection post implantation we developed a cat animal model of otitis media. In addition we examined the effectiveness of different sealing strategies compared to the alternative of leaving the electrode entry point unprotected. For sealing of the cochlea fibrous tissue or gelatine foam was wrapped around the electrode in the round window niche.

22 kittens (44 ears) were used for this study. 32 ears were implanted at 2 months of age, and all 44 ears were inoculated after 2 months with a broth of streptococcus pneumoniae and the animals sacrificed one week later. The bullae of the animals were swabbed and the cochleas processed and examined under light microscopy.

Histological analysis of the cochleas showed the highest incidence (45%) of labyrinthine spread of infection in the unimplanted control group. Suppurative or serous labyrinthitis was found in only one third (33.3%) of the implanted and unsealed cochleas. In contrast only one of 16 sealed cochleas (6.2%) showed labyrinthine signs of acute inflammation.

Experimental pneumococcal otitis media could be reliably established in all animals and proved to be a valuable animal model for the testing of the intracochlear spread of infection.

We conclude that a cochlear implant electrode inserted via the round window does not increase the risk of tympanogenic labyrinthitis. Our results indicate that grafting of the electrode entry point results in significant protection of the inner ear against labyrinthine spread of otitis media along the leadwire of the cochlear implant.
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