

Abstract EFAS/DGA 2007

Corticosteroids and cochlear implantation – useful treatment to reduce electrode insertion trauma? Results from CAP- measurements of cochlear-implanted guinea pigs

Tillein, J. (1, 5), Ye, Q. (4), Kiefer, J. (3), Gstoettner, W. (2), Braun, S. (1, 2, 5)

(1) Dept. of Sensory Physiology II

(2) Dep. of ENT J.W.Goethe University, Theodor-Stern-Kai 7, 60590 Frankfurt am Main, Germany

(3) Technical University Munich, ENT Dept., Germany

(4) Dept. of Otolaryngology Fujian Provincial Hospital, Fuzhou, China

(5) MedEl Innsbruck Austria

Preservation of residual hearing is particularly important for patients with combined electric-acoustic stimulation (EAS). Corticosteroids are widely used clinically to treat a number of hearing disabilities like sudden hearing loss. Prevention of noise trauma (Takemura et al 2004) and ototoxicity (Himeno et al 2002) have been demonstrated in animal experiments. Administration of corticosteroid resulted in a reduction of electrode impedance pointing to a reduction of tissue growth around the electrode (de Ceulaer et al 2003). This suggested the application of steroids also in EAS patients in order to reduce insertion trauma and preserve residual hearing (Kiefer et al 2005).

A systematic evaluation of the efficacy of corticosteroids relating to permanent cochlear implantation has hitherto not been conducted. The present study therefore addressed the question whether steroids administered to the cochlea improve hearing preservation after implantation.

Three groups of guinea pigs were implanted with electrodes (supplied by MED-EL) through a cochleostomy in the basal turn of one cochlea. Either 3µl of triamcinolone, dexamethasone or artificial perilymph (AP) was infused with a micro-syringe directly before implantation. The other ears were treated equally (omitting implantation) and served as an additional control. By means of click-evoked CAP-measurements and frequency-specific CAP-audiograms recorded using RW-electrodes, hearing loss (HL) was measured before and after drug/AP application and during the following 3 months.

HL was most pronounced in implanted ears treated with AP. CAP-audiograms showed smaller threshold shifts at all frequency ranges for steroid-treated animals. Efficacy of dexamethasone was evident in the course of three weeks after implantation declining afterwards. For Triamcinolone a preservative effect was seen from day 7 and afterwards. The results indicate that the two steroids reduce hearing loss caused by cochlear implantation even after a single application. Dexamethasone probably requires a repeated or sustained application to extend protection over a longer space of time. Supported by DFG 161-2 & MED-EL.

Literatur:

deCeulaer et al., Otol Neurotol 2003;24:769-74.

Himeno et al., Hear Res. 2002 May;167(1-2):61-70.

Kiefer et al., Audiol Neurotol. 2005 May-Jun;10(3):134-44

Takemura et al., Hear Res. 2004 Oct;196(1-2):58-68.

