Auris Nasus Larynx xxx (2012) xxx–xxx

Contents lists available at SciVerse ScienceDirect

Auris Nasus Larynx

journal homepage: www.elsevier.com/locate/anl

Letter to editor

Auditory brainstem implant indications

Dear Editor,

In reaction to the interesting and thorough review of Sennaroglu L, Ziyal I. Auditory brainstem implantation. Auris Nasus Larynx 2012;39(5):439–50, we would like to comment on some of their statements and conclusions.

The authors have written an extensive review concerning auditory brainstem implantation and address many topics: the history of ABI and its development, the indications and contra-indications, the selection of side of implantation, CI vs. ABI, anatomy and surgical considerations, and several more.

Within these paragraphs decision making and its surgical aspects are well discussed.

They state that there are many indications, but that often a CI has to be attempted first, if possible. Like in NF2, an indication that in many cases leads to an ABI implantation, we completely agree that the authors stress that efforts should be made to initially perform a cochlear implantation when the cochlear nerve can be preserved.

Indications

In the same paragraph other indications (than NF2) are explained. In *advanced otosclerosis*, the authors state that if a CI is unsuccessful an ABI may be a solution. An unsuccessful cochlear implantation however seems very exceptional in advanced otosclerosis. And even when the outcome is unsuccessful, firstly a reprogramming, re-implantation, cochlear implantation on the contralateral side or referral to a more experienced implant center needs to be done before considering insertion of an ABI. We have seen many advanced otosclerosis cases, some with severe otospongeotic bone remodeling, some with complications requiring revision surgery, but all have had a successful rehabilitation with a CI.

Another possible indication, mentioned by Sennaroglu and Ziyal, are *bilateral fractures* of the temporal bone in association with avulsion of the cochlear nerve. This indication remains theoretical; it has never been supported by any publication or MRI scan. It is questionable whether a *bilateral* rupture of the cochlear nerve is possible without mortality. Only one single publication has been published with a single sided cochlear and facial nerve avulsion after trauma [1].

A remarkable indication is the *uncontrollable middle ear and mastoid disease*. An uncontrollable ear disease seems an unsatisfactory result/situation for an ear surgeon. Petrous bone cholesteatoma should be treated aggressively but well prepared [2,3]. Extensive infection of the temporal bone should be treated just as thoroughly, because it is potentially lethal [4]. If treatment is not possible at the current clinic the patient should be referred to a more specialized center. Hearing restoration is not of immediate importance in both types of pathology, before adequate control has been reached. Furthermore, even in less extended cases, the use of a subtotal petrosectomy to eradicate the disease and to create a cavity secluded from the outside environment, will lead to a controllable situation [5]. After confirmation of eradication of all disease in a single or second stage procedure, hearing rehabilitation can be achieved with either a bone conduction device, an active middle ear implant or a cochlear implant. If the ipsilateral ear is not an option for hearing revalidation the contralateral side can be evaluated. An ABI seems not indicated in these patients.

In prelingually deafened patients with a *malformation of the labyrinth* the authors state that a MRI can assess the presence of the cochlear nerve. We agree with the need for imaging, but do not support the indication for an ABI if the nerve seems to be absent on imaging. Several papers have now shown that the cochlear nerve or nerve fibers can still be present even when a cochlear nerve aplasia is suspected based on MRI findings [6–8].

Warren et al. have described that audiometric testing remains the golden standard for the presence of the nerve [7].

At the end of the indications paragraph the counseling of the patient or parents is well described by Sennaroglu and Ziyal. We also would like to compliment the authors on their very clear overview of contraindications for ABI.

Surgical approach

It is stated that the surgical technique of ABI using the retrosigmoid approach (RS) is the preferred approach because the translabyrinthine approach (TLA) might lead to *contamination of the cerebrospinal fluid with middle ear flora*, suggesting a risk of infection. In our experience with over 2000 surgical removals of vestibular schwannoma's or other tumors using TLA we proved that the danger of contamination and meningitis is minimal (less than 0.05%) and only correlated to CSF leakage (0.8%). No correlation between meningitis and the TLA approach was found [9]. The fact that in the RS approach the cerebellum has to be retracted considerably more for getting access to the lateral recess, is in our opinion a more important risk to take into account in choosing the approach. One of the main advantages of TLA, only briefly discussed, is the easier view and access to the lateral recess and the foramen of Luschka, without the need for retraction of the cerebellum. Furthermore, in situations where cochlear implantation fails it is easier to convert to TLA for ABI insertion in a single procedure using an extended approach.

Finally, in the conclusion of the paper it is stated that auditory brainstem implantation is 'the only solution for hearing restoration for pathology where the cochlear nerve is disrupted or the cochlea is not surgically suitable for cochlear implantation'. We feel that also communication rehabilitation with sign language and lip-reading skills without either cochlear implantation or auditory brainstem implantation could have been mentioned and discussed,

0385-8146/$ – see front matter
http://dx.doi.org/10.1016/j.anl.2012.10.003

Please cite this article in press as: Merkus P. Auditory brainstem implant indications, Auris Nasus Larynx (2012), http://dx.doi.org/10.1016/j.anl.2012.10.003

since the results with especially ABI do not always have a favorable outcome or even have no result at all.

Still, it has been a pleasure to read this extensive review and despite the critical notes mentioned above we feel that Sennarolgu and Ziyal have added a valuable contribution to this exiting and developing field.

References

[1] Corrales CE, Monfared A, Jackler RK. Facial and vestibulocochlear nerve avulsion at the fundus of the internal auditory canal in a child without a temporal bone fracture. Otol Neurotol 2010;31(9):1508–10.
[2] Sanna M, Pandya Y, Mancini F, Sequino G, Piccirillo E. Petrous bone cholesteatoma: classification, management and review of the literature. Audiol Neurotol 2011;16(2):124–36.
[3] Pandya Y, Piccirillo E, Mancini F, Sanna M. Management of complex cases of petrous bone cholesteatoma. Ann Otol Rhinol Laryngol 2010;119(8):514–25.
[4] Rubin Grandis J, Branstetter 4th BF, Yu VL. The changing face of malignant (necrotising) external otitis: clinical, radiological, and anatomic correlations. Lancet Infect Dis 2004;4(1):34–9.
[5] Sanna M, Dispenza F, Flanagan S, De Stefano A, Falcioni M. Management of chronic otitis by middle ear obliteration with blind sac closure of the external auditory canal. Otol Neurotol 2008;29(1):19–22.
[6] Buchman CA, Teagle HF, Roush PA, Park LR, Hatch D, Woodard J, et al. Cochlear implantation in children with labyrinthine anomalies and cochlear nerve deficiency: implications for auditory brainstem implantation. Laryngoscope 2011;121(9):1979–88.
[7] Warren 3rd FM, Wiggins 3rd RH, Pitt C, Harnsberger HR, Shelton C. Apparent cochlear nerve aplasia: to implant or not to implant? Otol Neurotol 2010;31(7):1088–94.
[8] Song MH, Kim SC, Kim J, Chang JW, Lee WS, Choi JY. The cochleovestibular nerve identified during auditory brainstem implantation in patients with narrow internal auditory canals: can preoperative evaluation predict cochleovestibular nerve deficiency? Laryngoscope 2011;121(8):1773–9.
[9] Merkus P, Taibah A, Sequino G, Sanna M. Less than 1% cerebrospinal fluid leakage in 1803 translabyrinthine vestibular schwannoma surgery cases. Otol Neurotol 2010;31(2):276–83.

P. Merkus*
VU University Medical Center Amsterdam/EMGO+, Department of Otolaryngology – Head and Neck Surgery, Room ZH 1d-114, P.O. Box 7057, 1007 MB Amsterdam, The Netherlands

R.H. Free
Department of Otorhinolaryngology – Head and Neck Surgery, University of Groningen, University Medical Center Groningen, Hanzeplein 1, 9700 RB Groningen, The Netherlands

M. Sanna
Gruppo Otologico, Skull Base Center Piacenza-Rome, Via Emmanueli 42, 29121 Piacenza, Italy

*Corresponding author. Tel.: +31 20 4443690; fax: +31 20 4443688
E-mail address: p.merkus@vumc.nl (P. Merkus)

18 July 2012
Accepted 1 October 2012

Please cite this article in press as: Merkus P. Auditory brainstem implant indications, Auris Nasus Larynx (2012), http://dx.doi.org/10.1016/j.anl.2012.10.003