**Maturation of ABR in young children with congenital monaural atresia**

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**Background:** It is well known, that auditory deprivation may cause maturational changes of the auditory pathway within critical periods. To date, the impact of a sound conductive hearing loss (SCHL) on the auditory pathway at brainstem level has only been investigated in animal studies, where a species-specific delay of ABR inter-peak-latencies as well as plastic changes of binaural interaction could be observed. This question is of clinical relevance, as the indication of and time for hearing aid fitting in these young children with monaural atresia and contralateral normal hearing is still controversial.

**Methods:** In our clinical study, the functional maturation of ABR parameters in children with unilateral atresia of the external auditory canal was investigated. For this reason, 42 newborns and toddlers ranging in age from 13 days to 11 months were included. The click-evoked ABR interpeak latencies (IPL) of the atretic ears and the contralateral ears with normal hearing were evaluated. The children had no comorbidities and had never been fitted with any kind of hearing aid. Beside the intraindividual comparison of the maturation of ABR parameters in the deprived and normal ear, we compared the absolute latencies (AL) and IPL of a matched control group with normal hearing to the normal ears of children with monaural atresia.

**Results:** The mean air-bone gap in the ears with atresia was 44 dB HL. Despite this partial acoustic deprivation, no significant difference between the IPLs of normal ears and ears with atresia could be detected. The mean IPL in the atretic ears was 2.61 ms (± 0.2) for IPL I-III, 2.14 ms (± 0.2) for IPL III-V and 4.75 ms (± 0.3) for IPL I-V. In the contralateral normal ears, the mean IPLs were 2.63 ms (± 0.2) for IPL I-III, 2.19 ms (± 0.2) for IPL III-V and 4.83 ms (± 0.3). In the control group of bilateral normal hearing subjects, the mean IPL were 2.6 ms (± 0.2) for IPL I-III, 2.2 ms (± 0.2) for IPL III-V and 4.8 ms (± 0.4). Both for AL and IPL, the differences between the normal ears and the control group were all within a single standard deviation to the mean.

**Conclusion:** The data showed that the early monaural acoustic deprivation by a block of sound conduction does not produce any delay of functional maturation of monaural processing of auditory input at brainstem level in this group of patients within the first year of life. With regard to the AL and IPL on brainstem level, no differences between the normal ears of children with unilateral atresia and children with bilateral normal hearing could be detected. Thus deprivation effects of unilateral SCHL during early childhood, for example a disturbed binaural interaction, cannot be detected by monaurally evoked ABR. Any deprivation effects of a SCHL on binaural interaction or auditory processing at higher levels of the auditory pathway cannot be excluded.

**References:**

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