

Supplemental Material S2. Characteristics of studies on the prognostic value of eABR for CI outcomes.

Study Country	Study design	Diagnosis	Number of Participants: total, girls	Age, mean or range (years)	Age at CI (months)	Device	Uni/Bi	Follow-up period (months)	Electro-physiology	Outcome measures	Findings
Wang 2015 (China)	Retro	SNHL	40, 14	1.7-7.0	12-58.8	Nucleus	NR	3 to 26	Intra-operative eABR	CAP and SIR growth ^a	A correlation was found between the eV threshold and SIR growth. Children with better CAP growth had a lower eV threshold compared to those with lower CAP growth.
Yamazaki 2015 (Japan)	Retro	CND	19, NR	NR	26.7 (11.5)	Nucleus	5/14	24	Intra-operative eABR ^b	CAP	Poor speech performance in children with delayed eV compared to better speech performance in children with positive eV.
Jeon 2013 (Korea)	Retro	ANSD SNHL	11, 6 SNHL: 9, NR	4 to 8	NR	Nucleus, AB	Uni	ANSD: 40.4 (8 to 80) SNHL: 29.4 (13 to 59)	Post-operative eABR ^c	CAP	eABR was not recorded in 6 out of 11 children with ANSD. Children with recorded eABR showed relatively good speech performance post-CI, while the nonresponse group demonstrated variable outcomes.
Jeong 2013 (Korea)	Retro	ANSD	15, 5	3.5	70	Nucleus	NR	72.8	Post-operative eABR (3 weeks post-CI)	CAP, IT-MAIS, open-set MWT	eABR results were not different in children with good and poor speech perception outcomes.
Jin 2013 (China)	Retro	CND (IACS) Matched SNHL	NA	NR	NA	NA	NA	NA	Intra-operative eABR	CAP, SIR	A higher threshold and lower dynamic range of eABR, and lower speech performance outcomes were identified in the IACS group compared to the control group. The CAP score and eABR grade were correlated.
Valero 2012 (Canada)	Retro	ANSD with hypoplasia Matched SNHL	19, 10	NR	ANSD: 50.4 (12-155) SNHL: 51.24 (12-172.2)	Nucleus	ANSD : 17/2 SNHL : 17/2	At CI activation and every 3 months up to 24 months	Post-operative eABR	ESP, IT-MAIS, WIPI, GASP, MLNT, BKB words, LNT	In children with hypoplasia, single eV waves were recorded in some children, but most responses were abnormal. eV was also significantly delayed compared with the control group. Speech performance, the

										phonemes, BKB phonemes	PROSPER score, ^d was poor in both the initial and the most recent assessment and did not improve over time.
Song 2010 (Korea)	Retro	CND, 9 with aplasia	13, NR	4.3 (1-13)	NR	Nucleus, AB	NR	26.5 (12-68)	Intra- and post-operative eABR and eCAP at 1, 3, 6, 12, 18, and 24	CAP, IT-MAIS	The average IAC was 1.78 mm (0.75-2.57 mm). Post-CI CAP scores ranged from 0 to 4. eABR was good, variable, and absent in 4, 3, and 6 children, respectively, which corresponded with CAP scores 4, 4, or 2, and 2 or 0, respectively.
Gibson 2009 (Australia)	Retro	SNHL	245, NR	NR	NR	Nucleus	NR	12 months for 245 children 24 months for 148 children	Intra-operative eABR	MSPS ^d	eABR waveforms were significantly different between those who scored 4 _≥ compared to lower scores in the Melbourne scale. After two years, the outcome showed greater differences.
Kim 2008 (USA)	Retro	CVN abnormalities G1: Mondini G2: other CV abnormalities G3: Aplasia	G1: 11, NR G2: 20, NR G3: 8, NR	NR	12-159	Nucleus, AB, MedEl	All uni	36	Preoperative promontory eABR	GASP for words and sentences, NUCHIP, minimal pairs test	Children with lower preoperative eABR thresholds had better postoperative speech performance. Larger eV amplitude and shorter latency were associated with better speech performance. Open-set sentence recognition test was possible in 73% of group 1, 30% of group 2, and 38% of group 3.
Walton 2008 (Australia)	Retro	A: Bilateral ANSD B: Bilateral ANSD with CND ^e	A: 39, 14 B: 15, 7	≤15	A: 40 B: 44	Nucleus	NR	12	Post-operative eABR, axial T2 MRI	MSPS	Children with CND showed worse speech perception scores (median score 1 vs. 4), higher rates of abnormal eABR (87% vs. 23%), and more associated inner ear abnormalities than children with ANSD without CND.
Nikolopoulos 2000 (UK)	Pros	SNHL	N: 47, NR G1: 35 with clear eV G2: 12 without eABR	NR	58	NR	NR	12, 24, and 36	Intra-operative eABR at the time of CI surgery	Iowa sentence test, CDT, CAP, SIR	Children with no preoperative eABR performed at levels comparable with children who had clear preoperative eABR.

AB: Advanced Bionics, ANSD: auditory neuropathy spectrum disorder, BKB: Bamford-Kowal-Bench sentence test, CAP: Categories of Auditory Performance, CDI: child development inventory; CDT: Connected Discourse Tracking, CI: cochlear implant, CVN: cochleovestibular nerve, DEAP: diagnostic evaluation of articulation and phonology, eABR: electric auditory brainstem response, ESP: early speech perception, G: group, GASP: Glendonald Auditory Screening Procedure, IACS: internal auditory canal stenosis, LNT: lexical neighborhood test, MLNT: Multi-syllable Lexical Neighborhood Test, MSPS: Melbourne speech perception score, NA: not accessible, NR: not reported, Pros: prospective, Retro: retrospective, SIR: Speech Intelligibility Rating, SNHL: sensorineural hearing loss, SP: speech perception.

^a Growth referred to improvement in CAP and SIR test scores.

^b The eV was considered present (positive eV) when two or more tested electrodes showed evoked waves meeting the following criteria: 1) reproducible responses with amplitude greater than 0.15 KV, 2) a current-dependent increase in amplitude, which suggests a neuronal response rather than a myogenic response, and 3) 3.8 to 5.0 milliseconds of the wave latency (Yamazaki et al., 2015).

^c The results of eABR were grouped into 3 categories: 1) good response: reproducible wave V responses at all apical, middle, and basal electrodes, with an eABR threshold of less than 1750 KA; 2) variable response: reproducible wave V responses measured only in limited electrodes and/or an eABR threshold of more than 1750 KA; 3) nonresponse: no identifiable wave V response in any of the electrodes.

^d MSPS includes 7 categories, in which levels 5, 6, and 7 show that open-set recognition of speech has been achieved (Walton et al., 2008).

^e Comorbidity: A 78% and B 67%, severe comorbidity: A 24% and B 47%, brain abnormality: A 56% and B 53%, Inner ear abnormality: A 8% and B 93%.