

Cochlear Implant Candidacy and Follow-Up: A Team Approach to Looking Beyond the Audiogram

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Introduction

A cochlear implant (CI) team consisting of professionals specializing in early identification of hearing loss and early intervention is key to successful outcomes. The CI Team Protocol at UTHSC and Children's Ear, Nose and Throat Specialists is outlined to guide parents and professionals in this sensitive decision process.

Clinical Questions

1. What are the key factors to consider in this individualized decision process?
2. How do parents make an informed decision during the first few months of an infant's life?
3. How do professionals guide parents during this critical time?
4. How is a toddler's progress with a new CI monitored over time?
5. How is a decision made regarding the second CI?

Case Study 1

Bilateral SNHL with monaural CI – parents not interested in 2nd CI

- Premature at 24 weeks gestation, maternal substance abuse
- NICU stay 5 ½ months ---Failed NHS
- Dx: bilateral severe to profound SNHL via ABR (CA 5 months)
- Etiology: JCIH 2007 risk factor(s)
- Following unsuccessful hearing aid trial (issued CA 11 mos), L CI surgery performed at CA 23 months due to custody issues
- L CI internal failed March 2013; explanted & re-implanted April 2013; Re-activated May 2013
- Wears right hearing aid (Phonak Certena Art SP) successfully
- Attends Head Start 4 days/week & auditory-oral therapy weekly (group & individual)

	Pre L CI CA 10 mo	Post L CI HA 6 mo	Post L CI HA 21 mo
PLS-4*/PLS-5	AC SS 63; 1%*	AC SS 73; 4%	AC SS 97; 42%
Perception	1 (scale 1-5)	3 (scale 1-5)	4 (scale 1-5)
Production	1 (scale 1-5)	2 (scale 1-5)	4 (scale 1-5)
Overall	1 (scale 1-5)	3 (scale 1-5)	4 (scale 1-5)

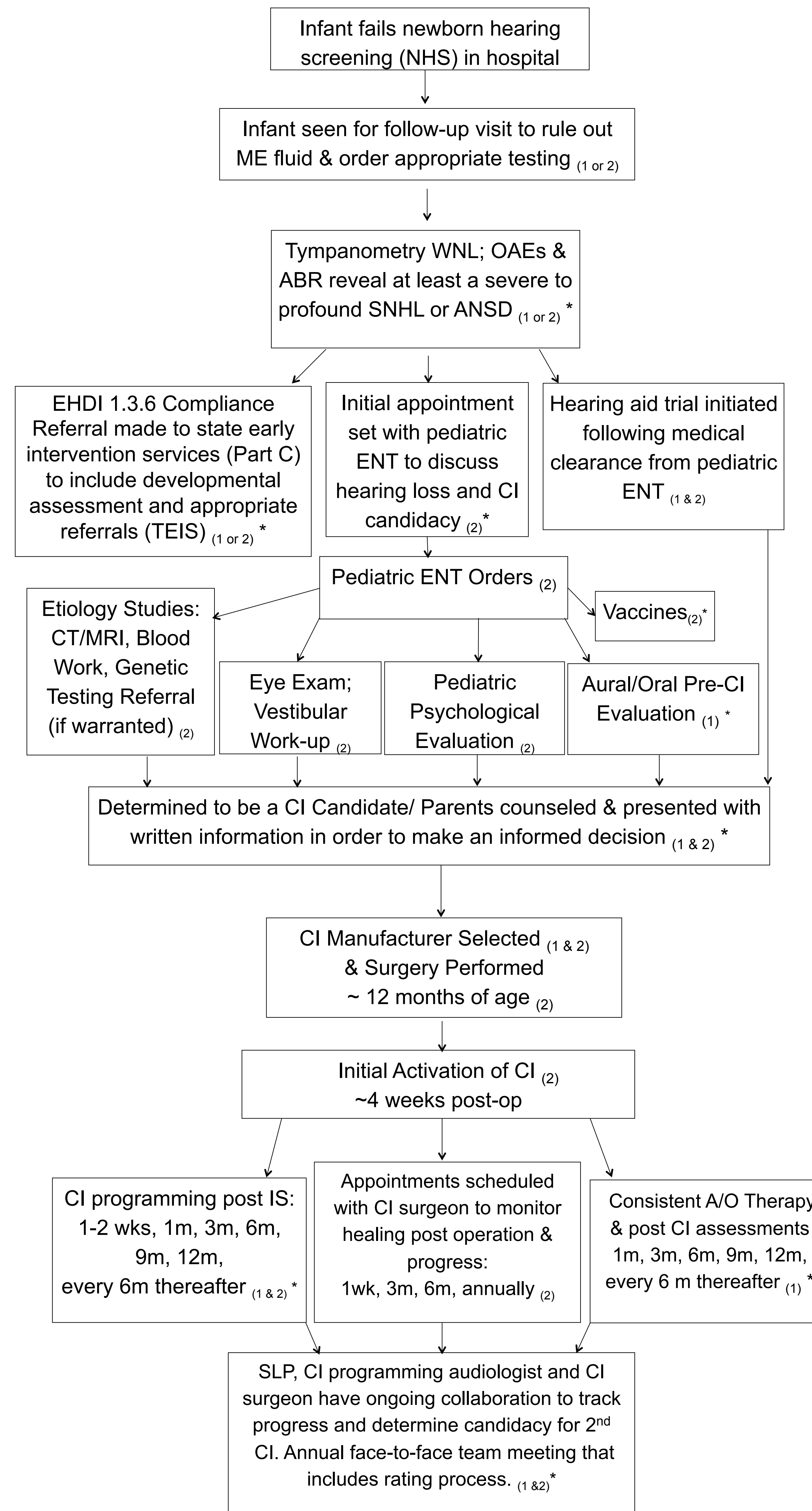
Case Study 2

Bilateral SNHL with binaural CIs

- Full term at 40 weeks gestation, normal pregnancy & birth
- No family history of hearing loss --Failed NHS
- Dx: at least a severe to profound SNHL via ABR (CA 1 month)
- Etiology: Connexin 26
- Following unsuccessful HA trial (issued CA 3 months), L CI at CA 12 months
- Progressed very well with her first CI (see table)
- R CI at CA 21 months
- Attends auditory-oral therapy weekly (group & individual)

	Pre CI 3 mos CA	Post L CI HA 1 mo	Post L CI HA 6 mos	Post CI CI HA 12 mos	Post CI CI HA 16 mos
IT - MAIS	7/40 = 18%	7/40 = 18%	15/40 = 38%	26/40 = 65%	29/40 = 73%
Perception	1 (scale 1-5)	2 (scale 1-5)	4 (scale 1-5)	4 (scale 1-5)	5 (scale 1-5)
Production	1 (scale 1-5)	1 (scale 1-5)	3 (scale 1-5)	4 (scale 1-5)	5 (scale 1-5)
Overall	1 (scale 1-5)	2 (scale 1-5)	3 (scale 1-5)	4 (scale 1-5)	5 (scale 1-5)

CI Team Protocol



Subjective 5-point CI progress scale

1= poor
2= fair
3= average
4= above average
5= excellent

Each of the 3 cases is closely monitored based on medical history and outcome measures. Outcome measures include standardized test scores and a 5-point subjective rating scale referenced in relation to hearing age (HA) rather than chronological age (CA).
* Handout available with additional information

Case Study 3

Bilateral Profound SNHL with monaural CI

- Premature at 25 weeks gestation
- 4 month NICU stay---Passed 1st NHS
- Photolight therapy x 4d/ Mechanical ventilation x 3wk/ Oxygen x 4wk
- Contracted postnatal CMV
- Failed 2nd NHS prior to d/c from NICU
- Dx: at least a severe to profound SNHL bilaterally via ABR
- Etiology: JCIH 2007 risk factor(s)
- Following unsuccessful HA trial (issued CA 7 mos), R CI (CA 15 mos)
- Pending continued progress, 2nd CI surgery will be scheduled
- Continues to wear LHA with little or no benefit
- Delayed development -- Receives OT and PT
- Attends auditory-oral therapy weekly (individual)

	Pre CI CA 15 months	Post CI HA 3 months
LittEARS Auditory Questionnaire	2	12
Perception	1 (scale 1-5)	2 (scale 1-5)
Production	1 (scale 1-5)	2 (scale 1-5)
Overall	1 (scale 1-5)	2 (scale 1-5)

Take Home Points

1. Careful consideration "beyond the audiogram" is essential for a successful CI Team approach to ensure recipients learn to listen and reach maximum communication potential.
2. Numerous factors determine candidacy, and the decision for implantation is made on an individualized basis. This ensures the best possible outcomes for the child, parents and family based on realistic expectations.
3. Professionals should provide parents with the information they need to make an unbiased and informed decision, while being equipped to monitor and share findings with one another prior to and after implantation.
4. Standardized test measures are an understood indicator to monitor progress. However, the CI Team's subjective 5-point rating system is an effective and efficient way to collaborate with one another regarding the CI user's listening and spoken language development despite separate administrative locations.

References *

- Eisenberg, L.S. (2009). Clinical Management of Children with Cochlear Implants. San Diego, CA: Plural Publishing, Inc.
- Kühn-Inacker, H., Weichbold, V., Tsiakpini, L., Coninx, S., D'Haese, P. (2003). Little Ears: Auditory Questionnaire. Innsbruck, MED-EL
- Pediatric Audiology Assessment and Amplification Guidelines. (2010). Tennessee Department of Health Newborn Hearing Program. Retrieved from <https://centerondeafness.utk.edu/newborn/Documents/TN-Audiology-Assess-and-Amp-Guidelines-Complete.pdf>
- Zimmerman-Phillips, S., Osberger, M.F., & Robbins, A.M. (1997). Infant-Toddler: Meaningful Auditory Integration Scale (IT-MAIS). Sylmar, CA: Advanced Bionics Corp. www.agbell.org
- Zimmerman, J.L., Steiner, V.G. and Pond, R.E. (2011). Preschool Language Scales, Fifth Edition (PLS™-5). Pearson Education, Inc.