When A Cochlear Implant Is No Longer An Option: Auditory Brainstem Implant Management and Outcomes Of An 11-Year Old Child At 16 Months Post

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Disclosures

- We have no relevant financial relationships with any commercial interest as it pertains to this presentation.
- Non-financial relationships include:
  - Holstad - Audiology Advisory Board Cochlear Americas
  - Shapiro - Audiology Advisory Board Cochlear Americas and Advanced Bionics
  - Roland - Advisor/Consultant for Cochlear Americas and Advanced Bionics

Past and Present Device Information

Age at Implant	Device Type	Internal Device	Number of Active Electrodes	Reason for Explant
2; 9	CI (1)	CI24RE(ST)	14 Partial insertion	Progressive electrode loss, aberrant output, poor sound quality, FNS, & pain
8; 4	CI (2)	CI24RE(ST)	9 Partial insertion	Ossification, FNS, high impedance, & compliance issues
9; 7	CI (3)	CI422	7 Partial insertion	Did not stimulate
9; 11	ABI (1)	ABI541	6 (18 channels)	NA

ABI

- Pre-initial activation OR eABR results revealed good neural responses.
- Initial activation (1-month post):
  - Day 1: Non-auditory side effects or auditory + NASE
    - Various BP modes – 16 possible channels
  - Day 2: Auditory and some NASE
    - MP2
  - Day 3: Auditory responses
    - Final: SPEAK, 250 Hz, 3 max, BP-5 to BP+14, 400 PW
- Auditory skills therapy initiated at 2-weeks post.
- Audiologic care transferred to Moog at 3 months.

Auditory Skills Therapy

- Followed a typical auditory skills hierarchy.
- Included pitch discrimination and ranking, program comparisons, and assessments.
- Collaborated with child's audiologists, therapists, and surgeons.

Auditory Skills Results

Skill	Set	Time Acquired Post Initial Activation
Ling 6 Detection	Closed	2 weeks
Pattern Perception	Closed	3 weeks
Ling ID	Closed (with repetition)	5 weeks
Spondee ID	Closed	8 weeks
Monosyllabic ID V&C	Closed	10 weeks
Spondee ID	Open	20 weeks
Monosyllabic ID C Only	Closed	22 weeks
Ling ID	Closed (without repetition)	6 months
Monosyllabic ID V Only	Closed	9 months
Common Questions/Phrases	Open	9 months

Auditory Concerns

- Frequent fluctuations in auditory skills.
- Perception of vowels poorer than consonants.
- Slow to see impact of MAP changes on skills.
- Connected speech tasks more difficult and progress slower than single word tasks.
- With connected speech, needs significantly slower rate and longer processing time.

Ongoing Programming Concerns

- Cobwebbing of current due to limited channels.
- MAP changes not directly related to aided thresholds.
- Low frequency detection good, but confuses some low frequency sounds (same w/CI).
- Initially, minor MAP changes resulted in a negative emotional reaction.
- Longer time period needed to see positive impact of programming changes.
- Less overall MAP stability.

Emergent Programming Concerns

- 3 months:
  - Perceived sound quality change described as “grrrr”.
  - Refused to wear device.
  - 2KHz aided threshold elevated to 70dBHL.
- 6 months:
  - Soft, distant sounds interfered with hearing.
- 16 months:
  - Parent noted negative change in responsiveness.

Speech Perception Test Results

Test	Mode	Best CI	ABI (1yr) and 16 mo. post
ESP – Pattern	REC	24/24	(23/24) 24/24
ESP – Spondees	REC	24/24	(23/24) 24/24
ESP – Monosyllables	REC	17/24	(15/24) 13/24
WIPI	REC	13/25	(17/25) 18/25
MLNT – Easy	MLV	7/12	(5/12) 7/12
MLNT – Hard	MLV	7/12	(4/12) 4/12
GASP – Words	MLV	DNT	(8/12) 9/12
GASP – Sentences	MLV	DNT	(10/10) 10/10
Common Phrases	MLV	DNT	KW (19/20) 10/20 Sent (9/10) 4/10

Conclusion

- When re-implantation with a CI is no longer a viable option for children with auditory/oral backgrounds, candidacy for an ABI should be considered.
- Positive, open collaboration on the part of professionals resulted in the best outcomes.
- The benefit from restoration of audition, for this child, far outweighed the unknowns surrounding auditory brainstem implants in children.

Thank you for your attention!

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