Implanting Sooner Rather Than Waiting:

Outcomes for children with asymmetric hearing loss diagnosed with Enlarged Vestibular Aqueduct (EVA), who received a cochlear implant

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Disclosures

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• Alex Arts, MD – none
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It is well documented that children with EVA do well with CIs


It is apparent that current test measures lack sensitivity to appropriately evaluate cochlear implant candidacy.


Areas in need of consideration in the EVA story:

– Optimal time of referral

– Optimal time of implantation

– *Progressive* thinking beyond current guidelines to help clinicians make a decision regarding the best time to recommend a cochlear implant
FDA labeling
Traditional Candidacy Assessment

• The most lenient criteria state:
  
  – ages 12 to 24 months: Bilateral profound SNHL
    lack of progress in simple auditory skill development with appropriate binaural hearing aids and 3 to 6 months of aural habilitation

  – ages 2 years and up: Bilateral severe to profound SNHL: Best aided test scores ≤30% on MLNT or LNT presented in quiet
Contemporary Candidacy

- *Contemporary Measures*
  - Test batteries use standard measures as well as more difficult measures to assess CI candidacy
  - Testing in noise
    - + 10 SNR, +5 SNR
  - Presentation level reduced to 50 dB SPL
  - More age appropriate or more difficult test measures are administered to aid in the decision
  - Outcomes of speech-language measures, performance in school, and potential progression of hearing loss are often considered

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• The purpose of this study was to evaluate the post-operative outcomes of 18 children with EVA who received an implant in their poorer ear despite having audiograms or preoperative speech recognition scores that fell outside traditional criteria (if based upon best aided condition)
Demographics

• 39 children were identified with EVA who received a CI at our facility
• Of these 39 children, 18 were found to have asymmetry and received an implant in their poorer ear.
• Subjects included
  – 7 Male ; 11 female
  – 10 IEVA; 8 EVA + IP2
  – 12 Unilateral, 5 sequential bilateral, 1 simultaneous bilateral
• Preoperative amplification
  - 2 Bicros
  - 14 Binaurally aided
  - 2 unilaterally aided
• 2 children presented with additional disabilities
• All children implanted between 2005-2016
Demographics continued

- **Age of implant**
  - 0 – 18 months = 1
  - 2 – 5 years = 7
  - 6 – 10 years = 3
  - 11 – 15 years = 7

- **Device (first ear)**
  - Advanced Bionics (n=1)
    - 1 90K
  - Med El (n=1)
    - 1 Pulsar
  - Cochlear (n=16)
    - 2 CI512
    - 1 CI422
    - 13 CI24RE CA
Preoperative audiometric thresholds

**Better Ear**

**Poorer Ear**
Preoperative Word Recognition
Best aided condition, in quiet, with PL of 60 dB HL

Current CI candidacy criteria test scores < 30%

Measures used
MLNT = 2
LNT = 10

Percent Correct

Pre
Contemporary Candidacy

Measures used:
5 = +10 SNR (2 = More difficult test measures)
3 = PL 50 dB HL
3 = Monaural assessment
6 = Poor Speech – Language skills
1 = met criteria

CURRENT CI CANDIDACY CRITERIA TEST SCORES < 30%
Post-operative Outcomes
Implanted Ear

LNT Word Score - Implanted Ear
Over Time

Percent correct (%)

Time point

Pre-CI
6 months post
12 months post

S1
S2
S3
S4
S6
S7
S8
S9
S12
S13
S14
S15
S17

OTOLARYNGOLOGY-HEAD AND NECK SURGERY
Post-Operative Speech Recognition Categories

• Category 1 - Detection

• Category 2 – open set word recognition ≤ 50%

• Category 3 – open set word recognition ≥50%

• Category 4 – open set sentence recognition ≤50%

• Category 5 – open set sentence recognition ≥50%
Post-operative Outcomes
Implanted Ear

Performance Category- Implanted Ear
Over Time

Performance Category

Time point

Pre- CI
6 months post
12 months post
24 months post

S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18

Post-operative Outcomes
Implanted Ear
Post-operative Outcomes
Bimodal Condition

Performance Category - Bimodal
Over Time

Time point
Pre- CI
6 months post
12 months post
24 months post

Performance Category
1
2
3
4
5

S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18

Post-operative Outcomes
Bimodal Condition
Post-operative Outcomes
Speech-Language
Summary

• Referral for and determination of CI candidacy has become a complex issue that requires careful consideration of several factors, not just the audiogram or speech recognition score.

• Many children receive benefit from a CI even though they do not meet “traditional” criteria.

• Decisions about CI candidacy that are made thoughtfully, based on clinical evidence, and made using sound clinical judgment can be life-changing and result in dramatic improvements in hearing.
Thank you