Optimal management of young children with conductive hearing loss - Cleft palate

KYLIE BOLLAND – PROFESSIONAL LEADER AUDIOLOGY
HUTT VALLEY DHB
Hutt Valley District Health Board
Hutt Hospital

PETE'S DRAGON

[Image of Hutt Hospital and a map of New Zealand]
Optimal management of young children with conductive hearing loss - Cleft palate

- What is Cleft palate
- Integrated cleft palate team at HVDHB
- Audit of babies born with Cleft palate 2015-2017
- Audiological management – BCHA
What is a Cleft Palate?

- The palate is a shelf of bone and/or tissue which separates the mouth (oral cavity) from the nose (nasal cavity) = roof of the mouth

- Cleft palate is a condition in which the two plates of the skull that form the palate are not completely joined in utero.

- Due to the absence of a completely joined palate the oral and nasal cavities are coupled
What is a Cleft Palate?
Prevalence of Cleft Palate?

- The rate in Western society is around 1 in 700 live births (1.4 per 1,000 live births).

- NZ data shows a national incidence of 1 in 559 live births.

- The overall rate is statistically significantly higher in Māori compared to Non Māori: 1 in 422 vs 1 in 612.

- The increased rate amongst Māori is almost exclusively due to the increased rate of cleft palate alone in this population.

- This difference in rate suggests a genetic component is involved either directly or perhaps through interactions with environmental factors.
Cleft Palate: Impact on speech

- As there is an open connection between the oral cavity and nasal cavity, air leaks into the nasal cavity during speech resulting in a hyper nasal voice resonance and nasal emissions.

- Secondary effects include speech articulation errors (e.g., distortions, substitutions, and omissions) and compensatory mis-articulations (e.g., glottal stops and posterior nasal fricatives).
Cleft palate: Impact on Hearing

- High incidence of Eustachian Tube dysfunction
- Approx. 75% -90% of babies born with cleft palate will develop OME early in life
- Increased likelihood of acute infection and chronic otitis media
For children with cleft palate, who have a higher risk of persistent OME and significant CHL, as well as higher risk of speech disorder, the impact of OME may be greater than for other children.
Regional Cleft Palate Service
(HVDHB, CCDHB, WDHB, MCDHB, HBDHB, Whanganui DHB, NMDHB)

- Cleft Palate coordinator
- Consultant Plastic Surgeon x2
- Orthodontist x2
- Maxillofacial Surgeon
- Paediatric Dentist
- Speech Language Therapist
- Ear, Nose & Throat Surgeon (local DHB)
- Audiologist (local DHB)
Integrated Cleft Team at Hutt Valley

- Newborn/Infants
  - Separate consults with Plastic Surgeon, Orthodontist as required, Speech Language therapist (face-face, or phone)
  - Speech language therapist contact with family 6-9mths age and as needed prior to 2yr old.
Integrated Cleft Team at Hutt Valley

- At 2yr old
  - 10 minute Integrated cleft palate team apt
    - Plastic surgeon
    - Orthodontist
    - Maxillofacial surgeon
    - Paediatric Dentist
    - Speech Language therapist
    - Cleft Palate coordinator
Timeframe for Plastic Surgery

- Repair of Cleft lip at approx. 3mths old
- Repair of Cleft Palate at approx. 10-12mths old
- Consideration for ventilation tubes at time of palate repair – under same GA (HVDHB)
Universal Newborn Hearing Screening and Early Intervention Programme
National Policy and Quality Standards

Diagnostic and amplification protocols

January 2016
Data Audit

- Review of babies born with cleft palate in 2015 to 2017 (inclusive) for the Wellington region – 32 babies
  - Newborn Hearing screening results
  - Diagnostic Audiology (ABR & VRA) assessment results
  - Rate of hearing aid fitting
  - Average age for cleft palate repair
  - Speech and language 2yr old assessment results
Audit Results

Newborn Hearing Screening
- NBHS pass: 56%
- NBHS refer: 3%
- Direct referral: 41%

Diagnostic ABR results for babies referred from NBHS
- ABR CHL (includ mixed): 89%
- Incomplete: 11%
- NBHS refer: 0%
Audit Results

Audiology Assessment at 7-10mths old (VRA)
- VRA pass: 96%
- VRA CHL (incl Mixed): 4%

Bone Conduction Hearing Aid Fitting
- BCHA: 72%
- no BCHA: 25%
- DNA: 3%
Audit Results

Speech and Language Outcome at 2yr old

Average Age of Palate Surgery (mths)
Audit – key findings

- High rate of OME and significant conductive HL in babies with cleft palate at ABR and VRA assessments
- Relatively low rate of BCHA fitting despite protocol and high rate of CHL
- Range of age of cleft palate repair – average 12mths (range from 9mths to 17mths)
- Majority of children had speech and language significantly outside of normal limits at 2yrs old
Local protocol: Joint ENT/Audio/SLT

- Early discussion with family regarding impact of persistent MEE and conductive HL
- Early initiation of BCHA if CHL
- Joint SLT and Audiology
- Database of cleft palate patients – local coordination by Audio/ENT
Hearing Aid Management

- BTE hearing aids not generally appropriate due to possible fluctuating CHL and young age

- Newly available “non-surgical” BCHA – Oticon Medical Ponto Pro Power

- Previously fitted Bruckoff La Belle Jr with mixed results
Hearing Aid Management

- 9 children fitted with Oticon Medical Ponto Pro Power on bilateral soft headband
- Age range from 3mth old through to 10yr old
- Older children had previous Bruckhoff La Belle Jr BC aids
- All children had bilateral mild to moderate conductive hearing loss
  - Cleft palate (repaired/unrepaired)
  - Persistent middle ear effusion - Vts not currently appropriate
  - Persistent TM perforation – not yet appropriate for surgical intervention
Hearing Aid Management

- Fitted using BC in-situ measurement based on ABR HTL or measured BC via Ponto pro power device

- Validated BCHA fittings using recorded frequency-specific speech phonemes for “Aided audiogram”
Three Ling sounds /a/ ("ah" as in bath), /ʃ/ ("sh" as in shop) and /s/ ("s" as in sock), spoken by a native New Zealand English speaker.

100ms speech tokens representing three frequencies which between them cover a wide range of the speech spectrum – 1000 Hz, 4000 Hz and 6000 Hz, respectively.
Hearing Aid Management

- Aided testing for all patients obtained down to 20-25dBHL for the frequency-specific speech phonemes
  - Good access to speech
Hearing Aid Management

- Aided BKB Speech in Noise testing for older children
  - Results indicated SNR loss within normal/near normal range

- Parent feedback using Infant Hearing Program Amplification Benefit Questionnaire
Infant Hearing Program Amplification Benefit Questionnaire

TIMING
1. About how many MONTHS ago was your child first fitted with the PRESENT hearing aids? ________ months ago

ACCEPTANCE/USE OF HEARING AIDS
2. How much does your child wear his/her hearing aids in a typical day?
   
<table>
<thead>
<tr>
<th>Not At All</th>
<th>Less than 1 Hour</th>
<th>1 to 4 Hours</th>
<th>4 to 8 Hours</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Your child is happy to wear the hearing aids.
   
<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Most of the time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AUDITORY PERFORMANCE
4. Overall, how often do you think your child hears sounds with the hearing aids?
   
<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Most of the time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. How often do you think your child hears soft sounds with the hearing aids?
   
<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Most of the time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. How often is your child uncomfortable with loud sounds with the hearing aids?
   
<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Most of the time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EFFECTIVENESS OF SERVICE DELIVERY
7. Can you tell if/when the hearing aids are not working? (e.g., whistling, no sound)
   
<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Most of the time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Do you know how to check problems with the hearing aids when they occur? (e.g., dead battery, water or wax in earmold tubing)
   
<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Most of the time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OVERALL SATISFACTION
9. Considering everything, do you think the hearing aids are worth the effort?
   
<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Most of the time</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Considering everything, how satisfied are you with the hearing aid services you have received for your child, in the Infant Hearing Program?
    
    | Never Satisfied | Rarely Satisfied | Sometimes Satisfied | Most of the time Satisfied | Always Satisfied |
    |-----------------|------------------|---------------------|-----------------------------|------------------|
    |                 |                  |                     |                              |                  |

SERVICE IMPROVEMENT
11. Could the hearing aid services for your child be better? Please tell us how.
Hearing Aid Management

- Infant Hearing Program Amplification Benefit Questionnaire results
  - Improved acceptance of hearing aid over previous aid
  - Child happy to wear the hearing aid?
    - “most of the time” or “always”
  - Child’s ability to hear soft sounds with hearing aid
    - “most of the time” or “always”
  - Considering everything, do you think the hearing aids are worth the effort?
    - “always”
Hearing Aid Management

- Parental/child feedback further comments:
  - “More comfortable than previous aid, no whistling!”
  - “Teacher reports speech clarity is better and this is enabling her to socialise better with other children”
  - “his speech is clearer, TV volume was 80 now its down to 14!”
  - “He is less frustrated, says he can hear!”
Babies born with Cleft palate develop OME and this does not resolve naturally over time.

For children with cleft palate, who have a higher risk of persistent OME and hearing loss, as well as higher risk of speech disorder, the impact of OME on development may be greater than for other children.

Audiologists are the experts in diagnosis and management of hearing loss and have an active role in managing children with cleft palate.

Consider early initiation of BCHA trial.

Ponto Pro Power BCHA on soft headband is an effective hearing aid solution for this population.
Questions?

Thanks to

- Regional Cleft Palate Programme HVDHB
- Children and Families attending Hutt Hospital and Wellington Hospital
- Oticon Medical by providing an effective hearing solution via MoH

Kylie.Bolland@huttvalleydhb.org.nz