ABR Strategy
Intended Learning Outcomes

• What to do in this situation

• Testing order

• Exercises
What is the priority?

“To identify all children born with moderate to profound permanent bilateral deafness within 4-5 weeks of birth”
First stop: OAE

- OAE
  - No parental concern
  - No indicators of neural problems from the screen
  - No medical indicators for ABR e.g. bacterial meningitis / cCMV

- Total offered appointments = 388
- Attended appointments = 227
- Discharged on diagnostic OAE = 116
First stop: OAE

Reasons for using ABR in diagnostic appointment

- Well baby unilateral CR OAE / NCR AABR screen: 40
- NICU unilateral CR OAE / NCR AABR screen: 6
- NICU bilateral CR OAE / NCR AABR screen: 10
- Technical problems on screen: 1
- Strong FHHL: 6
- Skull fracture: 1
- Gentamycin: 2
- Pinna malformation: 1
- CFA: 1
- Cleft: 1
- Atresia: 1
- cCMV: 2
- Meningitis: 8
- NICU: 24
- Inconclusive diagnostic OAE: 2
- Technical problems on diagnostic OAE: 2
- Retest: 53
- NCR on diagnostic OAE: 50
What is the priority?

“To identify all children born with moderate to profound permanent bilateral deafness within 4-5 weeks of birth”
Auditory Brainstem Response

- 1st test
  - 4kHz
  - Bilaterally – irrespective of screen result

- To discharge level (≤30dBeHL for most babies)

- 1kHz not required
  - Some sites do (local decision)
Which side?

• Start with better ear
  – Screen result

• Start with available ear??

• Unilateral losses: test better ear down to 20dBeHL
  – Is this usually necessary?
Discharge
Discharge Exceptions

- cCMV
  - $\leq 20 \text{dB} eHL$ at 1kHz and 4kHz
  - Then for follow-up

- Bacterial meningitis
  - $\leq 20 \text{dB} eHL$ at 1kHz and 4kHz
  - Follow-up a local decision
Scenario 1

• Referral from screen
  – Clear response on left
  – No clear response on right
• No risk factors of note

• What test do you want to do?
  – Test
  – Ear
  – Stimulus
Scenario 2

• Bilateral referral from screen
• Diagnostic OAE NCR bilaterally

• What test do you want to do?
  – Test
  – Ear
  – Stimulus
    • Type
    • Intensity
Step Size

- 20dB until in the right ball park

- 10dB between CR, RA and confirmation traces

- 5dB steps if:
  - Loud levels and baby might wake up?
  - Big differences in 10dB step
Raised AC

- What is the most important next bit of information?
- Type of loss or shape of loss?
- What if this is the last bit of ABR information we get?
Scenario 3

- Bilateral referral from screen
- AC 4kHz Left ear threshold = 50dBeHL

- What test do you want to do?
  - Test
  - Ear
  - Stimulus
    - Type
    - Intensity
What are the chances?

- **Positive Predictive Value**
  - probability that people with a positive screening test have the condition

- Overall PPV for PCHI = 6.7% (1 in 15)
- Bilateral referrals PPV = 16% (1 in 6)
- Unilateral referrals PPV = 3.4% (1 in 30)

<table>
<thead>
<tr>
<th></th>
<th>All PCHL</th>
<th>Bilateral PCHL</th>
<th>Unilateral PCHL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screen refer-all</td>
<td>6.7 (6.6–6.9)</td>
<td>4.2 (4.1–4.3)</td>
<td>2.5 (2.4–2.6)</td>
</tr>
<tr>
<td>Screen refer-bilateral</td>
<td>16.0 (15.6–16.5)</td>
<td>14.0 (13.6–14.4)</td>
<td>2.0 (1.9–2.2)</td>
</tr>
<tr>
<td>Screen refer-unilateral</td>
<td>3.4 (3.3–3.5)</td>
<td>0.8 (0.7–0.9)</td>
<td>2.6 (2.5–2.7)</td>
</tr>
</tbody>
</table>

- **NB Conductive losses?**
Scenario 4

- Bilateral referral from screen
- AC 4kHz Left ear threshold = 50dBeHL
- AC 4kHz Right ear threshold = 70dBeHL

- What test do you want to do?
  - Test
  - Ear
  - Stimulus
    - Type
    - Intensity
Conductive Losses

- One study from looking at 27,935 infants covered by the screen of those with a loss identified:
  - 51.4% conductive,
  - 34.9% sensorineural
  - 13.8% mixed


Atresia

- **Unilateral**
  - Better ear 4kHz and 1kHz
  - Affected ear – BC first
  - Affected ear – AC if time

- **Bilateral**
  - BC bilaterally
  - AC if possible
Scenario 5

First appointment

- AC 4kHz Left ear threshold = 50dBeHL
- AC 4kHz Right ear threshold = 40dBeHL
- Then baby woke up

What test do you want to do on second appointment?

- Ear
- Stimulus
  - Transducer
  - Intensity
Relationship between consecutive tests

- What is the likelihood that AC has changed?

- How long do you want to wait?

Scenario 6

- Bilateral referral from screen
- AC 4kHz Left ear threshold = 90dBeHL
- AC 4kHz Right ear threshold >100dBeHL
- BC left 4kHz >50dBeHL
- BC right 4kHz inconclusive

Next appointment: What do you want to do?
  - Test
  - Ear
  - Stimulus
Scenario 7

- Right ear referred from screen
- AC 4kHz Left ear threshold ≤ 30dBeHL
- AC 4kHz Right ear threshold = RA at inconclusive at 80dB

Next appointment: What do you want to do?
- Test
- Ear
- Stimulus