MANCHESTER 1824

The University of Manchester

ABR Strategy

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Intended Learning Outcomes

- What to do in this situation
- Testing order
- Exercises

What is the priority?

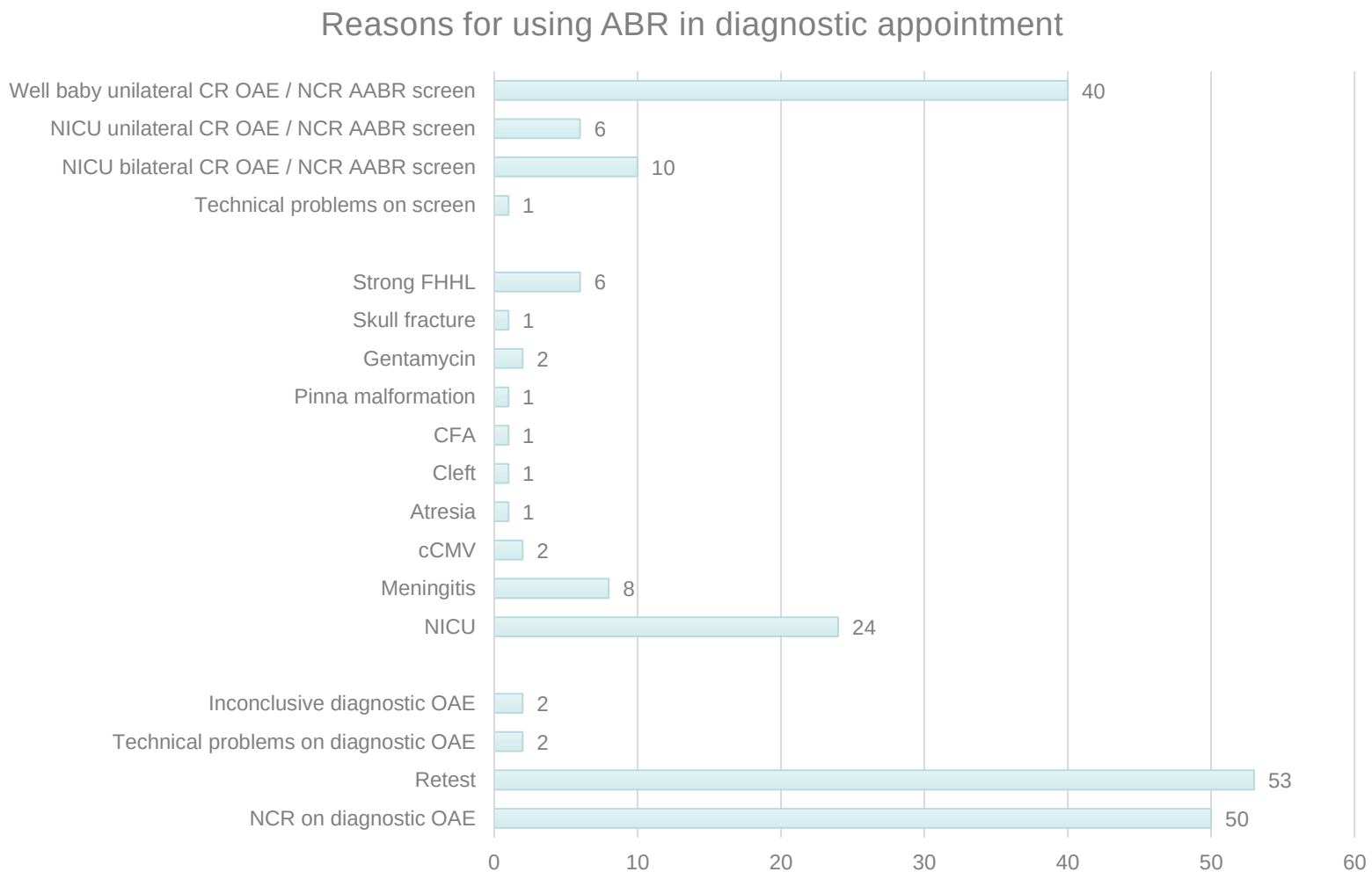
"To identify all children born with moderate to profound permanent bilateral deafness within 4-5 weeks of birth"

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



What is the priority?

"To identify all children born with moderate to profound permanent bilateral deafness within 4-5 weeks of birth"

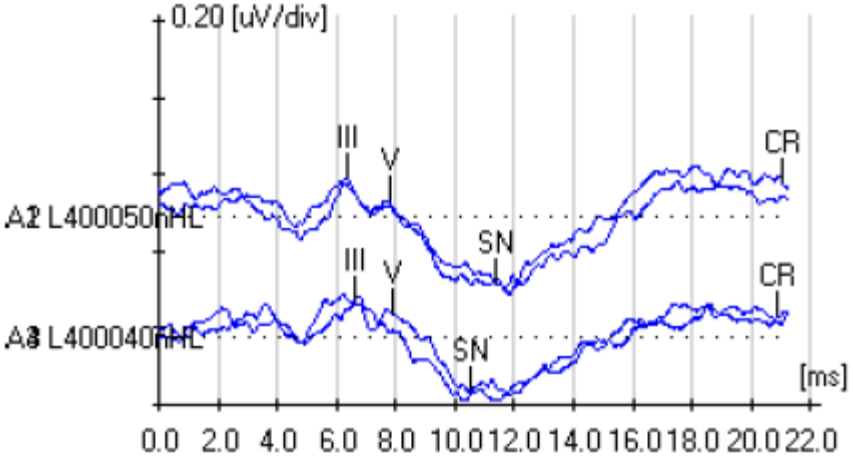
Auditory Brainstem Response

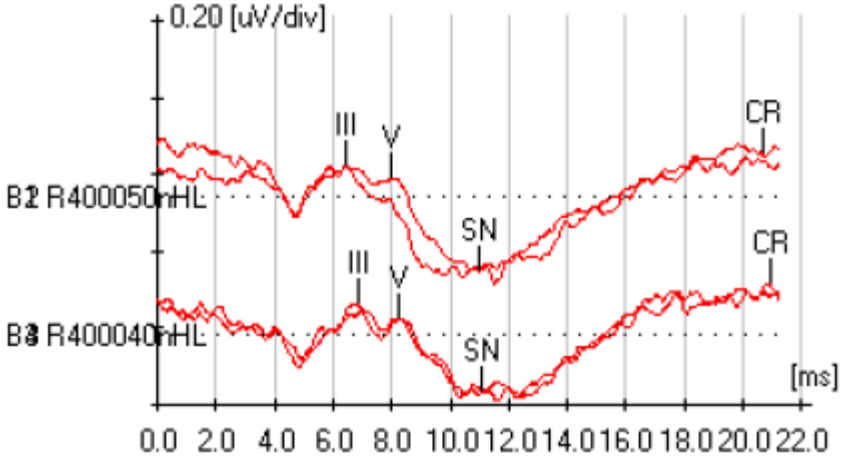
- 1st test
  - 4kHz
  - Bilaterally – irrespective of screen result
- To discharge level (≤30dBeHL for most babies)
- 1kHz not required
  - Some sites do (local decision)

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


0.20 [uV/div]
III
V
SN
CR
A2 L400050nHL
A3 L400040nHL
[ms]
0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0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III
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CR
B2 R400050nHL
B3 R400040nHL
[ms]
0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0

Discharge Exceptions

- cCMV
  - ≤20dBeHL at 1kHz and 4kHz
  - Then for follow-up

- Bacterial meningitis
  - ≤20dBeHL 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)

	All PCHL	*Bilateral PCHL*	*Unilateral PCHL*
All			
Screen refer-all	6.7 (6.6–6.9)	4.2 (4.1–4.3)	2.5 (2.4–2.6)
Screen refer-bilateral	16.0 (15.6–16.5)	14.0 (13.6–14.4)	2.0 (1.9–2.2)
Screen refer-unilateral	3.4 (3.3–3.5)	0.8 (0.7–0.9)	2.6 (2.5–2.7)

- NB Conductive losses?

Wood, S. A., Sutton, G. J., & Davis, A. C. (2015). Performance and characteristics of the Newborn Hearing Screening Programme in England: The first seven years. *International journal of audiology*, *54*(6), 353-358.

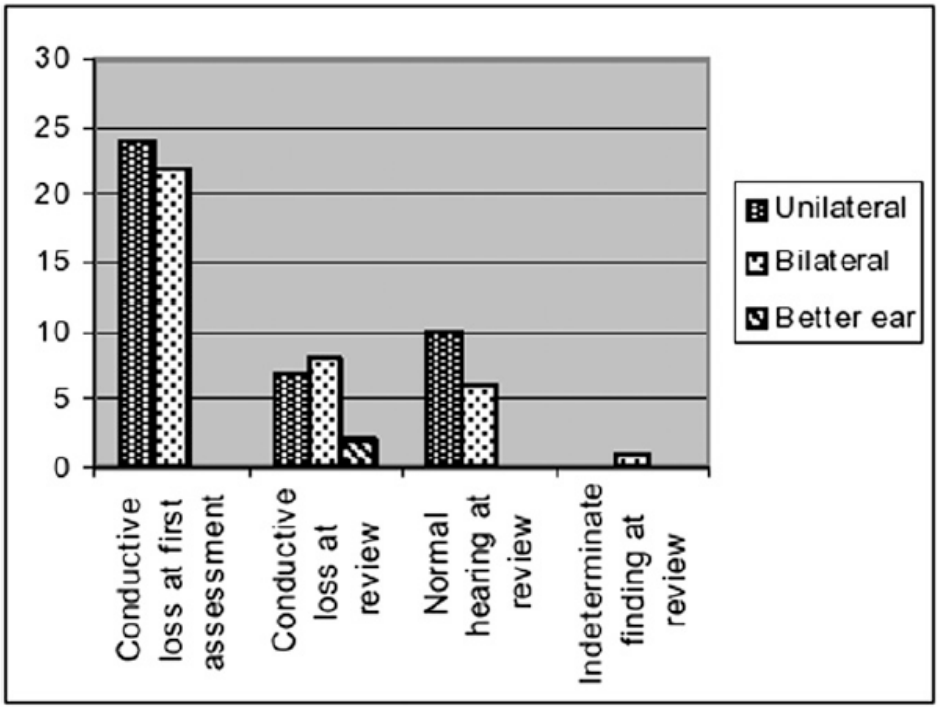
Scenario 4

- 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



Wroblewska-Seniuk, K., Dabrowski, P., Greczka, G., Szabatowska, K., Glowacka, A., Szyfter, W., & Mazela, J. (2018). Sensorineural and conductive hearing loss in infants diagnosed in the program of universal newborn hearing screening. *International Journal of Pediatric Otorhinolaryngology*, *105*, 181-186.
Aithal, S., Aithal, V., Kei, J., & Driscoll, C. (2012). Conductive hearing loss and middle ear pathology in young infants referred through a newborn universal hearing screening program in Australia. *Journal of the American Academy of Audiology*, *23*(09), 673-685.

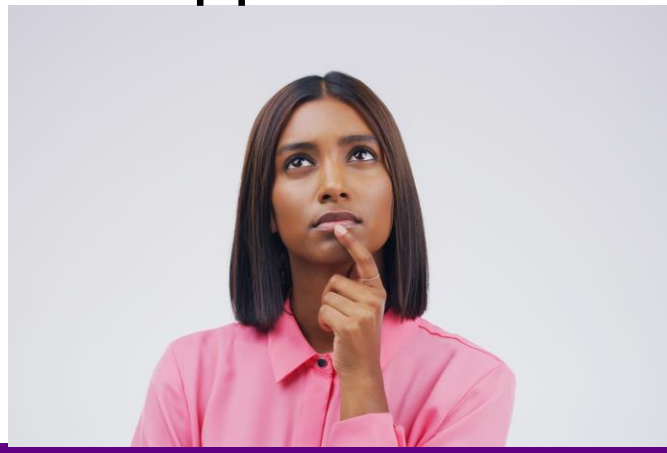
Atresia

- Unilateral
  - Better ear 4kHz and 1kHz
  - Affected ear – BC first
  - Affected ear – AC if time
- Bilateral
  - BC bilaterally
  - AC if possible

Scenario 5

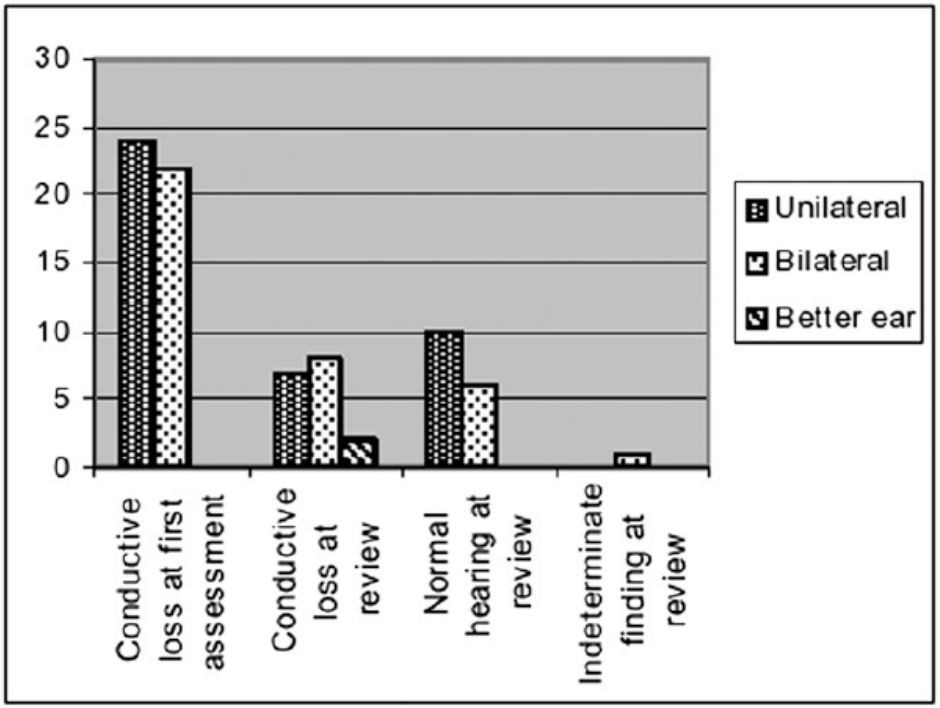
- First appointment
- AC 4kHz Left ear threshold = 50dBeHL
- AC 4kHz Right ear threshold = 40dBeHL
- Then baby woke up

- 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?



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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