SCREENING for HEARING LOSS in NEONATES

MK Thong, PY Tam, SZMS Mukari,TM Chew,
B Aminah, S Sivalal, S Sheamini,
J Rusilawati*

(* Ministry of Health Malaysia)

INTRODUCTION

Congenital permanent hearing impairment

- common neurosensory handicap in newborn & children
- prevalence differs from country to country
  - estimated prevalence internationally, 1.1 – 1.5 per 1 000 live births
- more prevalent than commonly screened medical conditions
  - hypothyroidism (25/100 000)
  - haemoglobinopathies (13/100 000)
  - phenylketonuria (7/100 000)
- no Malaysian data - estimated 840 babies annually
  - 30% cases associated with other neurodevelopmental conditions, mental retardation
  - 10-20 times higher in high risk babies than in general population

INTRODUCTION

- carried out technology assessment
- to determine
  - accuracy of screening test
  - effectiveness of screening
  - effectiveness of early detection
  - cost-effectiveness of a newborn hearing screening programmme
  - types of audiologic interventins
  - organisational implications

TECHNICAL FEATURES

Types of tests…

- **Otoacoustic emission (OAE) -** integrity of inner ear
- **Auditory brainstem response (ABR) -** identifies normal cochlear function but abnormal XIII cranial nerve function
- **Automated ABR (AABR) -** similar mechanism to ABR, but fully automated; allows variety of trained personnel to use it

Accuracy of screening tests

- **OAE –** quick, easy, inexpensive, referral rate 34-44%, sensitivity 78-99%, specificity 90-99%
- **AABR –** slower (8-20min), > complicated, > expensive, referral rate 0.2-2.5%, sensitivity 96-99%, specificity 99-100%

Screening test…

- **to reduce false positives 2 step approach**
  - OAE done twice
  - OAE followed by ABR
  - AABR for those failing 1st test
- **Accuracy of tests affected by -** child crying, middle ear effusion, external ear debris

results...

EFFECTIVENESS OF SCREENING

- Lack of overt physical signs - identification is late without screening programme
- Age of detection
  - 42.0 months [UK, 1997]
  - 3 years [National Institute of Health Panel, 1993]
  - 14.5 months [National Institute of Health Panel, 1997]
  - 48.0 months [National University Malaysia 1990]

    (high risk children – 41 months; children without risk – 53 months)

SCREENING
UNIVERSAL vs HIGH RISK

- Most authorities endorse universal screening programme
  - National Institute of Health, USA; Task Force on Newborn and Infant Hearing, American Academy of Pediatrics; US Joint Committee on Infant Hearing; Center of Disease Control and Prevention, US; Canadian Task Force on Preventive Health Care; UK National Screening Committee
- US Preventive Services Task Force - insufficient evidence to recommend for or against Universal Newborn Hearing Screening
- Swedish HTA agency - insufficient cost effective data on universal screening

High risk screening

- Yield of screening & proportion of true positive results substantially higher
- may miss up to 50% of 'low risk' infants with congenital hearing loss

results...

ORGANISATIONAL ASPECTS

PRE-REQUISITES FOR A SCREENING PROGRAMME

- Well coordinated & closely knit services provision
- Availability of diagnostic services
- Availability of diagnostic facilities for referral
- Availability of audiologists (1:25 000 population) & speech language pathologists (1:10 000 population)

Local scenario - audiologists **1:370 000** population;
speech pathologists **1: 275 000** population
(60 audiologists; 80 speech language pathologists)

results...

ORGANISATIONAL ASPECTS

2004

- Audiology services
  - in 26 public hospitals
- Speech pathology services
  - in 22 public hospitals

2003

- Equipment for diagnostic assessment
  - available in 13/16 hospitals that offer audiology services
- Equipment for fitting hearing aids
  - available in 19 public hospitals
- Rehabilitation services
  - Confined to urban areas
- Cochlear implants – University hospitals

RECOMMENDATIONS

- Targeted hospital based (high risk babies) screening program for hearing loss in hospitals where diagnostic & rehabilitative services available
- Universal screening in future