National Newborn Hearing Screening Conference

Aboriginal and Middle Ear Health

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It has been said that the effectiveness of the primary health care system in communities in developing countries can be gauged from the incidence of chronic otitis media …

Chris Prescott
WHO (1993)

• 51,000 deaths of children under the age of 5 years in developing countries from OM and its complications

• Population with OM rates 4%
  – High risk

• Population with OM rates >10%
  – Extremely high risk

Rates in Aboriginal children range from 7 - 70%
OM and Hearing Loss

• **Aboriginal children**
on average 32 months with OM between 2 months and 20 years
47% with a hearing loss of 25dB or greater in at least one ear

• **Non-Aboriginal children**
on average only 3 months for the same time period
4 – 5% of children with average hearing loss of 20dB
Main impact of middle ear disease

- Hearing impairment (1/3 population)
- Crucial speech and language development periods affected
- Inattention at school and truancy
- Social isolation, early school leaving
- Link between hearing loss and employment
- Significantly lowered educational and employment status in adulthood
“Spiral of Despair”

A spiral of “being ill before birth, of being poorly fed in childhood, of being deaf at school, of a life without work that will be cut short by a litany of disease and violence”.

John Ah Kit
Minister for Community Development
Northern Territory
Otitis Media (OM) is a major burden for Aboriginal and non-Aboriginal children.
BUT

OM starts at a younger age in Aboriginal children with a higher incidence of perforation and hearing loss.
Underlying Causes

• Multifactorial
  – In biological terms, greatest risk factor for early onset of OM is colonisation of the nasopharynx by multiple bacterial species

• Decreased host immune response
  – Stimulation of inflammatory cascade which damages mucosal tissue but fails to eradicate pathogens
Environmental Causes

- Overcrowding
- Poor living conditions
- Lack of clean water
- Hygiene problems
- Limited access to health care services
- Bottle feeding
- Swimming in polluted water
- Passive smoking
- Delayed treatment seeking behaviour
Kalgoorlie study

- Followed 100 Aboriginal children and 180 non-Aboriginal infants for 2 years
- OAE at birth
- Tympanometry at 9 months
- Audiology at 12-23 months
- ENT examination
Results

• All passed OAE
• OM or OME by age 4 months
  – 53% of Aboriginal children
  – 24% of non-Aboriginal children
SNHL in Aboriginal children

- WA Newborn Hearing Screening Program
- Data regarding race not collected by program
- Approximately 500 Aboriginal infants born per year at the five screening hospitals (approx 5% of infants screened)
- One Aboriginal child identified with SNHL
Research Directions

- OME may be difficult to detect clinically
- Tympanometry difficult under 4-6 months of age
- Except multifrequency tympanometry
  - Expensive
- 2 studies utilising OAE as a measure of middle ear status in under 7 months old children
Hearing screening and middle ear measures in Native American infants and children
Hunter LL, Daly K, Davey C, Kohtz A.

• 432 infants under 7 months
• Test fail
  OAE  25%
  Tympanometry  35%
  Otoscopy  15%

• Conclusion:
  – In children under 7 months, OAE may be an alternative measure of middle ear function if SNHL is ruled out
Prognostic value of otoacoustic emissions in children with middle ear effusion
Yeo SW, Park S, Park YS

• High prognostic value of TEOAE or DPOAE at 6kHz using a primary tone of 55dB SPL regarding predicting response to medical treatment in children with OME
• More aggressive treatment in children with OME with no response in these OAEs
Swimming Pool Study

• Impact of introduction of swimming pools on health of Aboriginal children and adolescents living in remote areas of WA
• Burringurrah and Jigalong
• 3 visits: ear examination, school attendance records, morbidity data from local clinics
Swimming Pool Study

Results

• Increase in the number of normal ears seen
• Decrease in the number of perforations
• Other improvements in health
  – Skin, eye (trachoma), rhinitis, chest
• Reduces truancy
  – “No school, no pool” policy
Tele-otology

• Middle ear disease is common among indigenous populations

• The majority of sufferers of the disease are found in rural/remote areas with restricted specialist access
WHEN YOU HAVE THE BIGGEST WAITING ROOM IN THE WORLD, YOU NEED ALL THE HELP YOU CAN GET!

Support the Royal Flying Doctor Service
Providing medical assistance for all Australians living, working or travelling outside our capital cities.
Video-otoscope
Imaging

- 3 to 5 images of each ear digitised and stored