Deafness

Deafness is often described as a "hidden handicap." Even children who are profoundly deaf may not be diagnosed until the second year of life or later. By this stage, children have already "missed out" on the early sound input so necessary for their normal speech and language development and their future cognitive functioning.

There are basically two types of deafness:

(1) **Sensorineural Hearing Loss** - (SNHL or nerve deafness). This is usually congenital, occurring in 1-2 per thousand Australian children. It may also occur following bacterial meningitis. In some high risk groups such as low birthweight infants and developmentally delayed children the incidence may be as high as 5-15%. SNHL is caused by a defect in the cochlea, auditory nerve, or central connections. Early diagnosis, fitting of hearing aids, and referral for early intervention services are essential if long term cognitive, developmental, and behavioural problems are to be minimised.

(2) **Conductive Hearing Loss** - This is caused by a disorder of the external or middle ear, the commonest case being secretory otitis media (SOM) or "glue ear." The precise incidence of this condition is unknown, but it is probably quite common among pre-school aged children. When severe or prolonged, it almost certainly has an adverse effect on the child's development, although the significance of mild, transient conductive hearing loss is uncertain. In individual cases aggressive management with antibiotic treatment and/or insertion of grommets results in improvement but further research is needed to establish treatment guidelines.

The transient nature of conductive hearing loss, the difficulties encountered in establishing the diagnosis, and the wide age range affected have meant that screening for this condition is largely ineffective. With sensorineural hearing loss, however, the condition is static, and (usually) present from birth - it fully satisfies World Health Organisation criteria as a condition suitable for screening.
Maternal and Child Health Nurses in a number of States perform hearing screening using the distraction test at 7-9 months. The test relies upon the infant’s ability to turn and localise a sound stimulus outside his or her field of vision. The test was designed to detect SNHL, although inevitably some cases of conductive hearing loss will also be detected. The test has been well validated and can produce accurate repeatable results, but there have been many problems with its performance.

Disappointingly, recent research suggests that the current screening program is largely ineffective. For example in Victoria in 1989 less than 1 in 3 children with sensori-neural hearing loss were fitted with hearing aids by the age of 18 months. The mean age at diagnosis of deafness was 38.5 months with a median age of 35.3 months. Of children ultimately diagnosed as having SNHL 40-60% had passed their MCHN screen. At present, we are far from our goal of fitting all deaf children with hearing aids by the age of 9 months.

The prospect of neonatal screening is attractive as the disability is diagnosed at the earliest possible time. Difficulty with behavioural audiometry in this age group has led to interest in tests measuring physiological responses to sound. The most widely used is the ABR (Auditory Brainstem Evoked Response) which involves analysis of changes in the infant’s EEG when sound stimuli are presented. The ABR is well suited as a screening tool as it is unlikely to miss any children who are deaf and yet there are few “false positives” on screening.

Screening all babies in the newborn period has been considered but would not currently be cost effective. Research has shown that about half the children with SNHL have at least one identifiable risk factor; hence if neonatal screening could be targeted at this group, a reduction in the mean age at diagnosis of deafness would be expected.

Based on present knowledge, the following program for hearing screening might be considered to provide the most likely cost-effective and reliable method of detecting deafness in infants:

1. Neonatal screening of “at-risk” infants with ABR.
2. Assessment of “at risk” status of infant at first visit by MCHNs (thus acting as a “safety net” in case these infants were missed in hospital).

Any infant “at-risk” should be referred to an audiologist for ABR screening. Any “not-at-risk” infant who fails two distraction tests should be referred for full audiological assessment.

Eight “at-risk” criteria have been identified:

1. **Parental concern** - This is often the single most significant factor in the early diagnosis of hearing loss and an immediate referral should be made to the nearest audiologist.
2. **Family history of congenital hearing loss** - This does not include adults with chronic ear disease, but rather families where a blood relative was born deaf or became deaf in the first five years of life. This may have been indicated by the wearing of hearing aids or affected speech.
3. **Rubella or CMV during pregnancy** - i.e. TORCH infections: Toxoplasmosis, Rubella, CMV, Herpes, AIDS, Syphilis.
4. **Birth asphyxia** - as defined by an Apgar score of less than 4 at 5 minutes of age.
5. **Birthweight below 1500g** - Babies of greater birthweight are significantly less at risk and should be referred only if there is another risk factor.
6. **Exchange transfusion or SBR (Serum Bilirubin) level greater than 350mmol/l.**
7. **Congenital abnormalities of the head and neck - eg accessory auricles, malformations of the external ear, cleft palate, Pierre Robin syndrome, Treacher-Collins syndrome, Down’s syndrome etc.**
8. **Other risk factors** - bacterial meningitis, developmental delay, suspected cerebral palsy.

Despite some criticisms of the efficacy of the distraction test, there is insufficient data at this stage to discontinue it. However, it is important that Maternal and Child Health Nurses are properly trained in its use, and have regular retraining sessions.

Maternal and child health and community nurses have a very important role to play in the early detection of deafness - they are often the first professionals to become aware of the risk factors or to suspect a hearing loss.

Dr Shirley Aldridge
MANAGEMENT OF GASTRO-ENTERITIS IN CHILDREN

The major complication of gastroenteritis in children is dehydration - a number of Australian children die each year because of dehydration caused by diarrhoea. Often the extent of dehydration is under estimated, especially in obese infants.

Acute weight loss (the most accurate index of dehydration), sunken eyes and fontanelle, dry mucous membranes of tongue and mouth, absent tears and decreased urine output require urgent medical referral. Decreased tissue turgor is a late and sometimes unreliable sign in children, especially if they are obese. Parents should be asked about intake of fluids, and frequency of diarrhoea and vomiting, as well as the number of wet nappies. The combination of poor intake and increased fluid loss, especially vomiting, is more serious than one sign alone.

- Treatment of Gastroenteritis

Infants who are breastfed should continue to be fed as thirst dictates. While flat lemonade has traditionally been recommended for the treatment of gastroenteritis, recent work has demonstrated that this is too high on osmotic load for children with gastroenteritis, and may make the diarrhoea worse. If lemonade, cordial or fruit juice is going to be used, it should be diluted one part to four parts of water.

However the most satisfactory treatment is to use oral rehydration fluid such as Gastrolyte. This is available across the counter at the chemist, and parents should be instructed to make up the fluid carefully according to instructions on the packet. Gastrolyte should not be diluted with other drinks such as cordial. If Gastrolyte is not available, one level teaspoon of table sugar can be used with 120 mls of water. For infants who are breast fed, oral rehydration fluid could be given as well. Food can be recommenced after 24 hours treatment with oral rehydration fluid. Young babies should not be off milk food for longer than 24 hours.

If infants refuse clear fluids offer formula diluted to one part milk to four parts water. The most accurate way to monitor dehydration is by weighing the infant or child, preferably on the same scales without any clothes on.

- Management Decisions

Reassure and advise re fluid requirements - if family able to cope, vomiting is not interfering with fluid intake, and there is no dehydration.

Refer to doctor - if there is dehydration, if there is persistent vomiting, or the family is anxious.

Reassure parents that antibiotics and other medications do not have a place in the common presentation of gastroenteritis.

Michele Meehan

FEVER

Most childhood fevers occur in response to infection (the majority being viral) and play an important role in the individual's defence against infection.

- When is a fever too high?

Fever itself is not harmful until it reaches a level of 41.5 C. Discomfort may be caused by chills as the temperature rises, and sweating as the temperature returns to normal. Hyperthermia, in which the body temperature is raised above the hypothalamic set point (which may be normal or elevated) is very rare in childhood. Temperatures above 41°C in children are usually seen as a result of CNS infection (with a direct effect on the hypothalamus) or as a result of human error, either a heat load, eg a child shut into a car on a hot day or interference with heat loss, eg over wrapping a febrile child.

- Complications of Fever

Complications of fever in childhood include mild dehydration if fluid intake is inadequate to replace the increased fluid losses, and febrile convulsions, which occur in 5% of febrile children between six months and five years.

Febrile convulsions are a relatively common but almost always harmless complication of fever in early childhood.

- Management of Fever

Parents should be encouraged not to treat low grade fever. The nurse can assist by pointing out its beneficial effects. Treatment of fevers above 39.5°C is directed towards reducing discomfort and preventing febrile seizures. The
latter cannot always be achieved, as febrile convulsions are triggered by a rapid rise in temperature, rather than its absolute level.

1. Antipyretics - control fever by lowering the thermoregulatory set point, and causing vasodilatation and sweating. Paracetamol is the preferred drug for children as side effects are minimal. Salicylates are metabolized more slowly in children, leading to accumulation and potential overdosage, and are linked to the development of Reye's syndrome in children with varicella or influenza.

2. Cooling measures - undressing the child, sponging with lukewarm water, use of fans, etc, are not effective and may cause intense discomfort to the child with fever, as all physiological mechanisms will be utilized to defend the current thermoregulatory set point, resulting in shivering, piloerection and vasoconstriction. If used in conjunction with previous administration of paracetamol, temporary benefits may be obtained.

3. Other measures - rest, adequate fluids, and treatment of the cause of fever is appropriate.

However, fever in infants younger than 6 months always needs to be taken seriously, and a medical evaluation is always necessary to exclude serious illness. All children with fever, especially younger ones, who do not look well should be carefully assessed to exclude serious illness. In a later issue we will be writing about the recognition of serious illness in infants and young children.

Dr Jill Sewell

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**From the Literature**

**Combined Effect of Infection and Heavy Wrapping on the Risk of Sudden Unexpected Infant Death**


A team of British researchers set out to determine the contribution of infection to sudden unexpected death (SUD) in infants. Over a period of 2 years from May 1987 to April 1989, 95 cases of SUD (index babies) were included in this study. Two control babies (190) were matched for age with each index baby.

Specimens of body fluids were collected from the index babies shortly after death and tissue samples and swabs of all major organs taken at autopsy. Parents were interviewed about signs of recent illness, baby’s sleeping position, and the type and quantity of bedding covering the baby both at bedtime and at death.

Viruses were identified in 20% of the babies who died. The median age of babies who died was 94 days with peaks between 40 and 60 days and again between 80 and 130 days with a trough at 70 days. There appear to be two distinct age groups.

The study results reveal a greater risk of SUD in the second group - babies over 70 days old - who also had a viral infection and were covered by clothing and bedding in excess of 10 togs. Viral infection alone; however, cannot be considered to be a major risk factor for SUD.

The authors concluded that the combination of infection and overheating may contribute to over one third of SIDS cases. Parents should be counselled to avoid excess clothing and heavy wrapping of their infant has an infection.

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