

# Universal neonatal hearing screening: to screen or not to screen

Universal neonatal hearing screening has been a long time coming. The goals of neonatal screening are to accurately identify babies with hearing loss, and to rehabilitate those identified as early as possible. Behavioural screening of neonates is not accurate enough. The Crib-o-gram<sup>1</sup> records a neonate's response and movements to sound as he or she lies quietly in the crib. Unfortunately, the false-positive rate is unacceptably high and the procedure has been abandoned.

Early screening programmes to detect neonatal hearing problems concentrated on at-risk babies. Risk factors for hearing impairment include a family history of congenital hearing loss, intrauterine infections, a birthweight of less than 1500 g, neonatal hypoxia, and hyperbilirubinaemia. It soon became clear, however, that if screening were confined to those at risk, only half of the congenitally deaf children would be found; the remaining half simply have no known risk factors. Furthermore, according to a consensus statement from the United States, language and speech develop mainly during the first 3 years of life, but hearing problems are detectable at a mean age of nearly 3 years; thus, "for many hearing-impaired infants and young children, much of the crucial period for language and speech learning is lost."<sup>2</sup>

Several recent developments have spurred on efforts to screen for neonatal hearing defects. The discovery of otoacoustic emissions promised a quick and reliable diagnostic test.<sup>3</sup> Further refinements in screening included the use of distortion product otoacoustic emission, rather than of transient-evoked acoustic emission, thereby increasing test specificity. In addition, although measuring the auditory brainstem response is cumbersome, it has long been regarded as the gold standard in testing difficult-to-test individuals (eg infants), and the method has now evolved into an automated screening protocol.

Interventions, too, have improved. The development of the cochlear implant into a clinical tool has made early and effective rehabilitation of the congenitally profoundly deaf infant a reality. The earlier that the cochlear implant is installed, the better the result in hearing and speech development. Profoundly deaf children often receive the implant at around the age of 2 years. Early identification of congenitally deaf infants by screening for impaired hearing is now an imperative.

So why is there still debate over whether universal infant hearing screening should be implemented? I must commend the authors of an article on the subject in this issue of the Journal.<sup>4</sup> The researchers at a university hospital have

convincingly argued that such a screening programme could be implemented. However, there are several outstanding considerations.

Firstly, the prevalence of congenital deafness is marginal, especially in the context of mass screening. In the data from the article by Ng et al,<sup>4</sup> 0.28% of babies tested were found to have bilateral moderate hearing loss, but none were found to have bilateral severe hearing loss, which arguably is the main reason for the screening. Hence, perhaps there is a problem of efficiency. Linked to this problem is the lack of a study in the literature that addresses the cost-effectiveness of screening. Only by demonstrating the cost-effectiveness of the endeavour can new resources be found.

Secondly, there is still a problem of false-positive results. In this series,<sup>4</sup> 3.5% babies were referred for further audiological assessment, of which 0.28% were subsequently found to have permanent hearing loss. Therefore, more than 90% of those who underwent further testing were found to have normal hearing. It is possible to reduce parental anxiety by prior counselling; nevertheless, it must be a worrying time for some of the parents until the definitive tests are done.

Thirdly, and specifically for Hong Kong, current paediatric hearing assessments are provided by many different institutions: Hospital Authority hospitals, some private hospitals, university departments, maternal and child health centres, and child assessment centres. One might say that the services are fragmented and overlapping. It will not be easy to create order from this situation.

Nevertheless, there is good evidence to indicate that universal infant hearing screening can achieve the goals of early identification and intervention. In the United States, an early hearing detection and intervention programme funded by Centers for Disease Control and Prevention has been in place in the past few years. Available data clearly indicate that as more and more infants are screened, more and more of them are enrolled into programmes of intervention.<sup>5</sup>

So, to screen or not to screen; yes...probably.

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