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A study on risk factors of deafness in neonates: a descriptive study

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ABSTRACT

Background: Identification of newborn hearing loss is addressed in the healthy people 2010 goals, stated as "increasing the proportions of newborn who are screened for hearing loss by age one month, have audiologic evaluation by age 3 months and are enrolled in appropriate intervention services by age 6 months.
Methods: The study was conducted between October 2008 to October 2009 at Manipal Hospital, Bangalore. The study group constituted of 200 ears of 100 neonates (0-28 days) that were randomly selected. The neonates were taken from immunization clinic, newborn nursery, neonatal ward and intensive care unit of our hospital and also those referred from other hospitals.
Results: Out of 100 the neonates aged between 1-4 days were 67, 5-9 days were 24 and between 10-28 days were 9.
Conclusions: There were no neonates with low Apgar score, no family history of hearing loss, no exposure to ototoxic drugs and no neonate on mechanical ventilator.

Keywords: Deafness, Neonates, Risk factors

INTRODUCTION

The first recommendation for the development and nation wide implementation of "Universally applied procedures for early identification and evaluation of hearing impairment" came in 1965 from the Babbidge Report, a report of the Advisory Committee on Education of the Deaf. Efforts have continued since this time to further reduce the age at which a child is identified as having hearing loss ,with the ultimate goal that " all infants with hearing loss be identified before 3 months of age and receive intervention services initiated by 6 months of age".[1]

The two main reasons for the evolution of recommended NHS practice from targeted to universal were advances in technology and poor yield of infants hearing loss with high risk screening. The discovery of ABR in 1971 and OAE by David kemp in 1978 paved the way for quasi – automatic electrophysiological NHS devices becoming available near the end of 1980s and 1990s.[2,3,18] Pilot projects and continued improvements in technology demonstrated these techniques to be fast and accurate means of screening newborns.[4-7]

In 1973 the JCIH recommended that mass newborn behavioral screening be continued in favor of testing only those infants determined to be at risk according to five identified risk criteria on the HRR.[8] The JCIH revised this statement in a 1982 statement when it updated the recommendations and added two more criteria to the original five high risk indicators.[9] After that number of developments led to the JCIH producing a 1994 position statement in which it changed its goal of targeted high risk screening and endorsed "the goal of universal detection of infants with hearing loss as early as possible All infants with hearing loss should be identified by three months of age and receive intervention by 6 months of age.[10]

The most recent JCIH position statement reflect the realization of UNHS as the standard care and emphasizes

not only on the screening ,but also the system of providing comprehensive intervention services to infants where screening is only the initial component.

The Joint Committee of Infant Hearing issued a statement in 2000 recommending universal screening for hearing loss before hospital discharge in addition to principles and guidelines for hospital and state programs.[11]

Identification of newborn hearing loss is addressed in the healthy people 2010 goals, stated as "increasing the proportions of newborn who are screened for hearing loss by age one month, have audiologic evaluation by age 3 months and are enrolled in appropriate intervention services by age 6 months.[12]

METHODS

The study was conducted between October 2008 to October 2009 at Manipal Hospital Bangalore.

The study group constituted of 200 ears of 100 neonates (0-28 days) that were randomly selected. The neonates were taken from immunization clinic, newborn nursery, neonatal ward and intensive care unit of our hospital and also those referred from other hospitals.

An informed consent for both the tests BERA and TEOAE were taken from one of the parents after explaining them the methods of testing in their own language.

The newborn were subjected to TEOAE and BERA measurements while they were under natural Sleep. The TEOAE was done using Maico-ERO scan and BERA by HIS (Intelligent hearing systems). The well born babies were initially subjected to TEOAE and those which were passed in the test were discharged from the hospital. The well born neonates which failed in the test were followed after 6-8 weeks and were subjected to diagnostic BERA. The neonates with risk factors underwent both TEOAE and BERA and the results noted.

RESULTS

The neonate profile studied from October 2008 to October 2009 is given below out of 100 neonates studied, the gender distribution shows, 58 were males and 42 were females.

Table 1: Gender distribution of newborn studied.

Gender	Number	%
Male	58	58.0
Female	42	42.0
Total	100	100.0

Out of 100 the neonates aged between 1-4 days were 67, 5-9 days were 24 and between 10-28 days were 9.

Table 2: Age distribution of newborn studied.

Age in days	Number	%
1-4	67	67.0
5-9	24	24.0
10 & above	9	9.0
Total	100	100.0

The neonates had high risk factors such as hyperbilirubinemia, low birth weight and preterm as shown in Table 3.

Table 3: Risk factors.

Risk factors	Number (n=100)	%
Hyperbilirubinemia	2	2.0
Birth asphyxia	0	0.0
Pre maturity	2	2.0
Low birth weight	2	2.0
Craniofacial anomalies	0	0.0
Meningitis	0	0.0
Torch	0	0.0

There were no neonates with low Apgar score, (Table 4) no family history of hearing loss, no exposure to ototoxic drugs and no neonate on mechanical ventilator.

Table 4: Apgar score <7.

Apgar score <7.0	Number (n=100)	%
At 1 minute	0	0.0
At 5 minute	0	0.0

Table 5: Other investigations.

Other Investigations	Number (n=100)	%
Family history hearing loss	0	0.0
Exposure oto toxic drugs	0	0.0
On mechanical ventilator	0	0.0

DISCUSSION

The prevalence of hearing loss is significantly higher than that of other birth defects.[13]

The prevalence of newborn hearing loss was reported to be 1 in 1000 live births for many years. This figure however referred only to congenital profound hearing loss.[14] Hearing losses of mild moderate or severe hearing loss nor the unilateral hearing loss were taken in to consideration because it was difficult to accurately characterize hearing loss in infants prior to the advent of OAE and ABR screening.[15]

Furthermore early surveys did not include newborns at risk for developmental disabilities in which the presence of hearing loss is now known to be significantly higher than in well birth infant population.[15]

More recent studies have estimated a bilateral permanent newborn and infant hearing loss of 1.5 to 6 per 1000 live births.[16,17]

Apart from bilateral hearing loss, studies also indicate a significant prevalence of unilateral hearing loss is of 35%.[18] The age at which hearing impairment is diagnosed is significantly important for further speech and language development of the child, In the children with hearing impairment neuroanatomical development follows its regular path, however, if there are no audible stimuli, sensory pathways deteriorate.[19] The time requirements, variable state of newborn arousal, and subjectiveness of behavioral measurements in the past have prevented practical widespread screening. Parents, although occasionally extremely observant, typically fail to adequately identify hearing impairment in their own children before the first birthday. Even when subsequently proven to be correct, initial parental concerns are frequently discounted by well-meaning physicians or other health professionals. Currently, the average age of diagnosis for congenital hearing loss is 2½ years of age for children not screened at birth, and no trend toward improvement has been observed in this group.[20]

CONCLUSION

The neonates had high risk factors such as hyperbilirubinemia, low birth weight and preterm.

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