



ORIGINAL RESEARCH PAPER

Neonatology

THE NEONATAL COMPLICATION AND THE IMPACT OF HEARING

KEY WORDS: Newborn; Hearing Loss

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ABSTRACT

Objective: To correlate the between neonatal complication and the impact of hearing
Methods: We evaluated 60 newborns, divided into 3 groups based on level of NICU care with each group having 20 newborn . TEOAE and ABR was done in all group at discharge from NICU and 3 and 6 month review.
Results: The differences between groups were statistically significant as abnormal ABR was found in LEVEL 2 and 3 Care with neonatal complication then normal new born.
Conclusion: Among the various risk factor neonatal hypoxia is not considered a risk factor for hearing loss.

INTRODUCTION

Newborns with risk indicators for hearing loss have some coexistent neonatal complications. Neonatal hearing screening in newborns with complications should be performed using the evoked otoacoustic emissions (OAE) and auditory brainstem response (ABR) together provide a complete evaluation of the auditory system.^{1,2} Severe neonatal hypoxia, as evidenced by the Apgar scale value³, is considered a risk for hearing loss. Hypoxia plays a significant role in the death of hair cells and consequent hearing loss⁽³⁻⁶⁾. Outer hair cell which is the main recipients of acoustic signals are extremely sensitive to lack of oxygen caused by hypoxia which leads to sensorineural hearing loss⁽⁷⁾. Recent studies in guinea pigs showed a significant reduction in the cochlear blood flow during periods of hypoxia^(8,9).

Most of the studies show the influence of neonatal complications that are considered of risk for hearing loss in the ABR results. Low apgar score, very low birth weight infant and preterm with brochopulmonary dysplasia and mechanical ventilation may cause abnormal OAE and ABR. The objective of this study was to understand the real influence of neonatal complications considered of risk for hearing loss, in infants, using the sequential OAE and ABR evaluation.

METHODS

Study Population

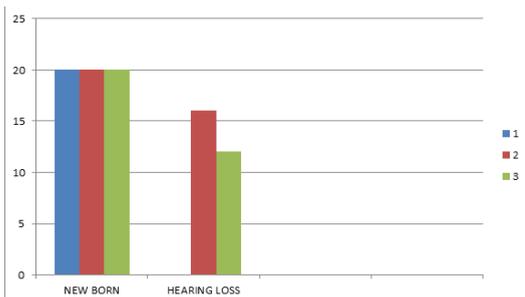
This study was conducted in a tertiary referral center from Feb 2016 till feb 2018 2010. New born admitted in NICU in Level 1, level 2 and 3 of NICU Care were subjected to otoscopy ,OAE and ABR at the time of discharge and 3 and 6 month Gestational age was divided into three categories: term ≥ 37 weeks, premature between 31 and 36 weeks, and extremely premature < 31 weeks.

Audiological Assessment Both OAE and ABR was done Interacoustics EP15 Eclipse (Interacoustics A/S, Assens, Denmark). Click stimulus was presented with intensity of 80-dB nHL Neo natal complication risk factor level of NICU gestational age, birth weight < 1,500 g, low Apgar score, infection, hyperbilirubinemia, ventilator. Outcome variables included absolute latencies (I, III, and V) and interpeak latencies (I to III, III to V, and I to V) of the ABR in both ears.

The relation between risk indicator for hearing loss and variation of ABR were analyzed using Mann-Whitney and Kruskal-Wallis test.

The result of TEOAE and ABR Table 1

NICU LEVEL	1	3	6
NEW BORN	20	20	20
ABR-NORMAL	32	16	12



MONTH	1	3	6
OAE-REFE	28	20	12
OAE-PASS	32	40	48
ABR-N	42	45	48
ABR-AB	18	15	12

The hearing loss was found in the level 2 and level 3 care which was found significant with hypoxia. In comparison to OAE and ABR the ABR wa predictive in hearing loss even at the earliest age .

DISCUSSION

Neonatal complication with particular treated at level 3 care are at high risk hearing loss .This study intended to show the real influence of risk indicators coexisting with prematurity In this real OAE and ABR was done at 3 times to study the predictive valve of OAE Aand ABR 3 time 1 to 6 month.OAE has variable at the new born and needs ABT to confirm the hearing loss.

Premature infants showed greater reduction in the absolute latency of wave I in both ears. The percentage of change in interpeak latencies I to III and III to V was higher in preterm infants than in full-term infants, giving the impression that auditory maturation occurs more rapidly in preterm infants. On the other hand, not only gestational age may cause ABR alterations, but other neonatal complications may as well contribute to auditory maturation impairment. Despite being frequently studied, both aspects are not considered concurrently.

New born with e Apgar score was less than 4 at 1 minute after birth and normal after 5 minutes showed no significant increase in the ABR latencies, but those infants who had a low Apgar score at 5 minutes after birth had significant differences in the absolute latency of wave III in both ears.

According to these findings, the low Apgar score at 5 minutes caused worse damages in the auditory pathway, despite increasing age. Jiang et al observed an increase in interpeak I to V only within the first 3 days of life, as well as normal results within 1 month of life for the newborns who had a low Apgar score but had good recovery after 5 minutes.The authors highlighted that the ABR changes observed within the first 3 days of life are of little significance because they normalized with the development of the maturation process. Therefore, a low Apgar score at 1 minute poses low risk for auditory changes, and a persistently low score may affect the auditory pathways.

An interesting finding in this study that has not been reported in the literature is that the infants who had a longer ICU stay, without considering the primary status of such admission, presented clear alterations between the first and second ABR assessments. Reductions in the absolute latency of wave III in the right ear, interpeak I to III in both ears, and in interpeak III to V in the left ear were statistically significant between the first and second assessments.

Other conditions contribute to the ABR differences, such as peri-intraventricular hemorrhage, maternal infection, chorioamnionitis, and neonatal infection or sepsis. These

conditions have been associated with the development of neonatal brain damage and adverse neurodevelopmental outcomes. In this study, alterations in the ABR components were observed in these infants, showing that the occurrence of this injury deserves special attention as its association with hearing loss is rarely reported in literature.

CONCLUSION

New born with neonatal complication has higher impact of hearing loss the normal new born .ABR has more predictive value in detecting hearing loss than OAE

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