

CORRELATION OF OAE WITH NEUROIMAGING IN ASPHYXIATED NEWBORN

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Abstract

Background: Perinatal asphyxia is recognized as one of the risk factor of hearing loss. OAE test is generally appropriate for screening neonates hearing. Neuroimaging is the initial investigation of choice in asphyxiated baby. Prevalence of hearing loss by OAE in asphyxiated newborn, Assessment of Abnormal Neuroimaging in asphyxiated newborn and Correlation of OAE finding with Neuroimaging in asphyxiated newborn. **Materials and Methods:** Prospective observational study was conducted in 78 inborn term asphyxiated newborns admitted in NICU of KMC, Katihar. **Result:** Out of 78 baby, 5 baby expired and remaining 73 samples, 53.42%(n=39) newborn were OAE referred and abnormal neuroimaging was found in 23.28%(n=17). Out of 39 OAE referred cases, 30.76%(n=12) have abnormal neuroimaging finding(p=0.105). In moderate asphyxia (n=45), 55% were OAE referred and 6.66% had abnormal neuroimaging (p>0.05). In severe perinatal asphyxia cases, 13 was OAE refer all these 13 cases were having abnormal neuroimaging (p<0.01). **Conclusion:** Birth asphyxia is one of the risk factor of hearing loss in newborns. Initial hearing assessment by OAE followed by BERA should be mandatory in moderate to severe cases of perinatal asphyxia.

INTRODUCTION

Birth asphyxia is recognized as one of the risk factor in hearing loss. The Joint Committee on Infant Hearing (JCIH) in 2000 recommended hearing screening test, especially for babies born with risk factors.^[1,2] Otoacoustic Emission test (OAE) is generally appropriate for screening neonates hearing.^[3]

Neuroimaging in asphyxiated baby is recommended in moderate and severe asphyxia and thus it is the initial investigation of choice in asphyxiated baby.^[4] Considering the infrastructure limitations in our country and not much studies are available in our knowledge regarding OAE in birth asphyxia with neuroimaging, this study was undertaken such that exorbitant costs of treatment could be prevented. Hence this study was conducted to study Prevalence of hearing loss by OAE in asphyxiated newborns, Assessment of Abnormal Neuroimaging in asphyxiated newborns and Correlation of OAE finding with Neuroimaging in asphyxiated newborns.

MATERIALS AND METHODS

This is Prospective observational study was conducted at NICU, Department of Pediatrics, Katihar Medical College, Katihar. Study Participants were 78 Inborn baby admitted in NICU of KMC fulfilling inclusion criteria. During the period of June 2021 to may December 2022. Institutional ethical committee approval was taken before starting the study. An informed consent was obtained from subjects willing to participate in the study.

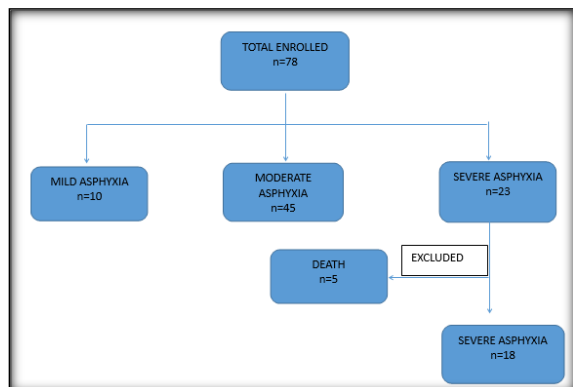
Inclusion Criteria

- Inborn
- Term
- Birth asphyxia defined as Apgar score of < 7 at 1 minute as defined by WHO. 5

Exclusion Criteria

- Preterm
- MSL
- NNJ with encephalopathy
- Suspected metabolic disorders
- Congenital anomalies
- Intrauterine infections
- Consent not given.

Sample Collection



Newborns with birth asphyxia were screened for OAE after stabilization (cardiorespiratory) and before discharge by trained Audiologist in acoustically treated room.

The screening was carried out using Path medical solutions model Sentiero.

Results were interpreted as 'pass' for normal hearing and 'refer' for who needed further evaluation

All newborns included in the study was undergone Neuroimaging study (USG Cranium/CT Brain/MRI Brain) preferably within 72 hours.

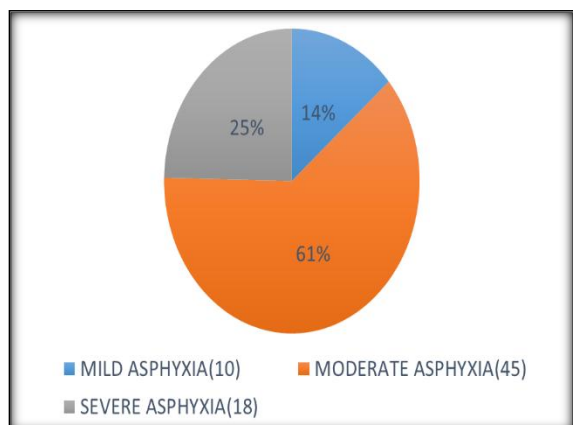
Preferably in most of the baby MRI brain was done, only in few USG cranium and CT brain was done who did not gave the consent for MRI brain.

Statistical analysis: The collected data was entered in MS-Excel, analyzed and statistically evaluated using SPSS 20.0 and chi-square test.

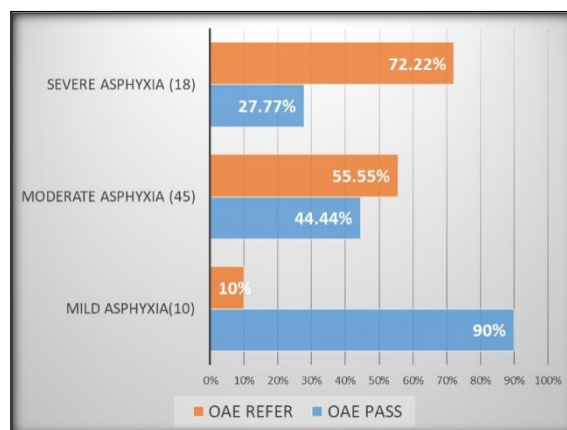
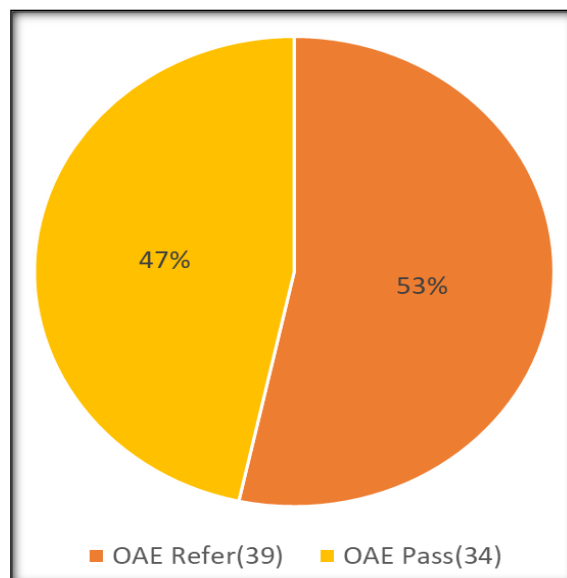
RESULTS

In all 73 asphyxiated newborns samples, 53.42% (n=39) newborns were OAE referred. Abnormal neuroimaging was found in 23.28% (n=17) of cases. Out of 39 OAE referred cases, 30.76% (n=12) have abnormal neuroimaging finding. (p=0.105).

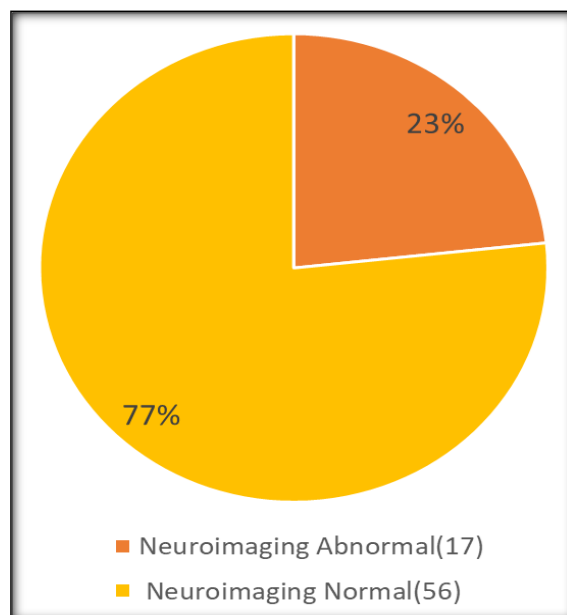
Total asphyxiated newborns (n) = 73

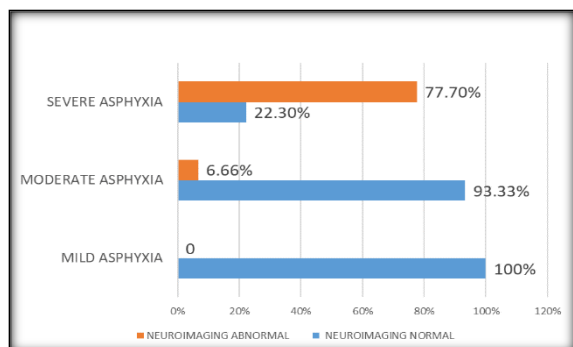


Prevalence of OAE refer



Prevalence of Abnormal Neuroimaging

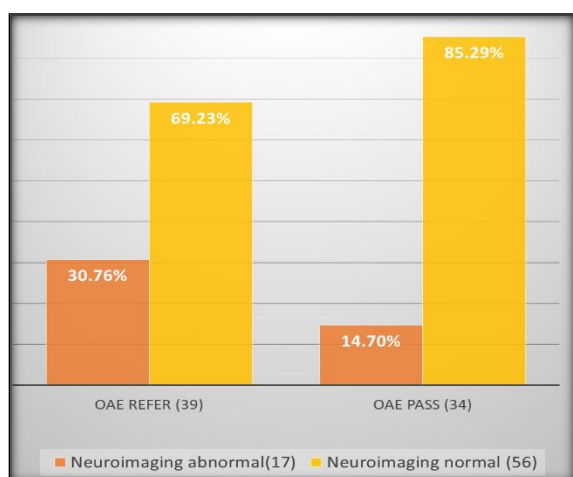




In moderate asphyxia (n=45), 55.55% were OAE referred and 6.66% had abnormal neuroimaging ($p>0.05$).

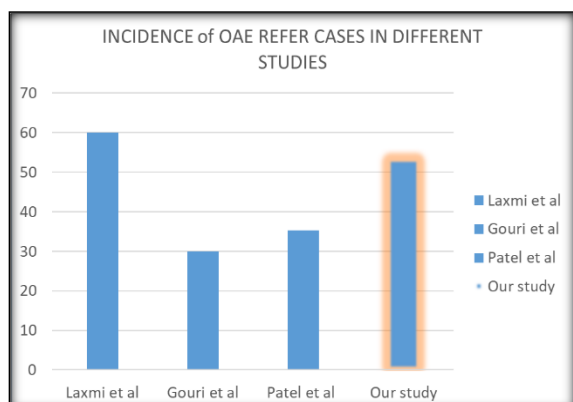
In severe perinatal asphyxia cases, 13 was OAE refer and in these 13 cases, all were having abnormal neuroimaging ($p<0.01$).

Abnormal neuroimaging in OAE pass and refer cases



DISCUSSION

Severe birth asphyxia is recognized as hearing loss risk factor by the Joint Committee on Infant Hearing (JCIH).

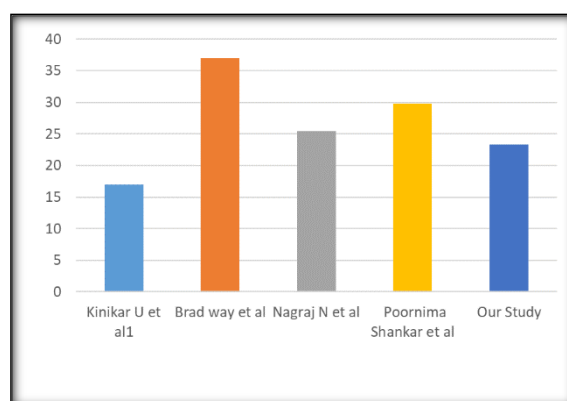


Prevalence of hearing impairment among neonates with birth asphyxia varies in different studies from NO hearing impairment to as high as 60%. Laxmi. T

et al found the prevalence to be 60%.6 Gouri et al and Patel. R et al found the prevalence of hearing impairment to be 30% and 35.3% respectively. [7,8] In our study, we found the incidence of 53.42% of OAE refer cases in asphyxiated babies.

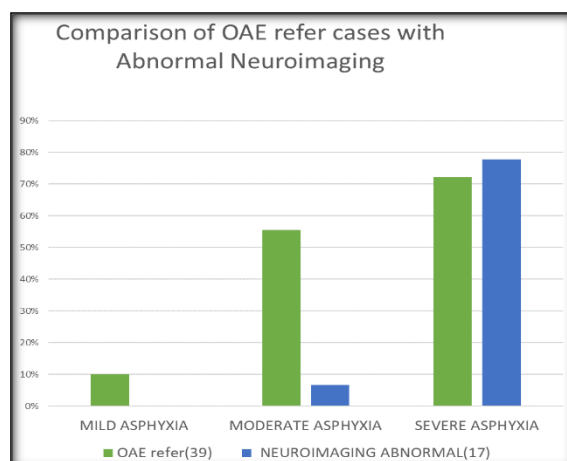
Incidence of abnormal neuroimaging in different studies.

In Kinikar U et al study, the incidence of early abnormal sonography with birth asphyxia was 17% which was statistically significant. [9] Brad way et al study who reported 37% abnormality in sonography. [10] Most of the other Indian reports have reported incidence of 25.45%, 29.8%. [11,12] In our study, we found the incidence of abnormal neuroimaging to be 23.28%.



In our study 23 males (48%) and 15 females (64%) failed the OAE ($p = 0.191$) and 18.75% males and 32% females had abnormal neuroimaging ($p=0.204$). We could not see any important difference between the two genders. Studies conducted by Aseel et al, Gouri et al among high-risk neonates for hearing impairment found no relationship between gender and hearing impairment. [13,14]

Comparison of OAE refer cases with Abnormal Neuroimaging.



In mild and severe perinatal asphyxia cases, relation between OAE refer cases and abnormal neuroimaging is found to be significant but not in moderate perinatal asphyxia. In our study, we found that babies with severe birth asphyxia which were OAE referred, all had abnormal neuroimaging finding.

CONCLUSION

Birth asphyxia is one of the risk factors of hearing loss in newborn. Initial hearing assessment by OAE followed by BERA (brainstem evoked response audiometry) could be mandatory in moderate to severe cases of perinatal asphyxia.

Limitation of Study

- Single centric
- Small sample size.

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