International Journal of Advanced Research and Development
ISSN: 2455-4030; Impact Factor: RJIF 5.24
Received: 25-06-2019; Accepted: 28-07-2019
www.advancedjournal.com
Volume 4; Issue 5; September 2019; Page No. 193-195

Study showing relation of obstructed labour in primigravida and deaf-mute children under 5 years

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Abstract
Brainstem evoked response audiometry (BERA) is a diagnostic tool which can be used to assess the early hearing loss and planning rehabilitative procedures. It is noninvasive and can be performed in uncooperative children under mild sedation or even under general anaesthesia. Aim of this study was to determine the hearing threshold to assess the deafness in children of suspected hearing loss and to find out the importance of BERA, in obstructed labour in primigravida. The study was conducted in ENT OPD, and Obstretic and Gynaecology OPD, LLRM, medical college. A total of 48 children were included in this study. All 48 children have been grouped in two categories. 26 patients were below age of two years. 22 patients were in age group of 2-5 years. 79% of the patients were males. Delayed developmental milestone and poor speech is the main indication for BERA. Out of 48 patients, 5 patients were found to have normal hearing as BERA showed normal responses. In 43 patients, BERA showed Mild to severe sensorineural hearing loss. 12 patients showed severe deafness, who were given hearing aids.

Keywords: brainstem evoked response audiometry, hearing loss screening, sensorineural deafness

Introduction
The ability to communicate is a crucial aspect of human life. Auditory acuity is very important for communication of any kin. Two-thirds of people with hearing impairment worldwide live in developing countries. But the effects of the hearing loss are often overlooked and have not received proper attention, public-health funding and services that it deserves. Reports from developing countries show the prevalence of hearing impairment among school children varying from 5.6% to 34%, least being in Kenya (5.6%), and highest being in India (34%) [1]. Brainstem Auditory Evoked Responses (BAER) or Auditory Brainstem Response (ABR) is the most common application of auditory evoked responses to test both ear and brain. It is an objective hearing test based on the recording of electrical potentials at the brainstem, generated in response to an auditory stimulus [2]. Prevalence of hearing impairment & hearing sensitivity among children will help us to know the burden of disability among children of below 5 years of age group, hence early diagnosis & rehabilitative procedure can be started which will help in speech and language development[3]. Labour is considered obstructed when the presenting part of the fetus cannot progress into the birth canal, despite strong uterine contractions. It is more common in humans than in primates, because the birth canal of a woman is not as straight and wide as in primates. The most frequent cause of obstructed labour is cephalo-pelvic disproportion - a mismatch between the fetal head and the mother's pelvic brim [4]. Neglected obstructed labour (OL) is a major cause of both maternal and newborn morbidity and mortality. The obstruction can only be alleviated by means of an operative delivery, either caesarean section or other instrumental delivery (forceps, vacuum extraction or simphysiotomy) [5].

Material and methods
The current study was a cross-sectional observation study. Children between zero to five years of age consulting or referred to ENT OPD, and Obstretic and Gynaecology OPD, LLRM, who fulfilled the inclusion criteria of study were included after taking informed consent. A total of 48 children were included in this study which is conducted during one year duration.

Selection criteria
Children of under five years of age with delay or no speech and language development, inconsistent response to sound or inability to respond to sound and history of difficult/obstructed labour in primigravida were included in the study. A pre-designed and pretested questionnaire was used to record the information. Audiological re-evaluation was done by using BERA to expand information regarding the youngster's auditory abilities. Patients suffering from supporative ear disease like ASOM or CSOM, systemic disease or any history of use of ototoxic drugs were excluded from the study. Examination of the participants included general physical examination and ENT examination. Examination of ear included pinna, preauricular area, post auricular area, external auditory canal; tympanic membrane and clinical testing of facial nerve function [6].

Bera Test
All children underwent BERA test as per the standard protocol. From the BERA waves following were considere: 1. Threshold level 2. Latency of each wave 3. Inter peak latency

Data analysis
Data analysis was done by using Descriptive Statistics.

Results
The following study was conducted in LLRM, medical college, Meerut from July 2018 to July 2019. Total 48 patients were included in the retrospective cros-sectional study who met the inclusion criteria and underwent BERA. Results have been put in the table form.

1. **Age of the patient:** All 48 children have been grouped in two categories. 26 patients were below age of two years. 22 patients were in age group of 2-5 years.

Table 1

Age	no. of patients	percent
0-2 years	26	54
2-5 years	22	46

2. **Sex of the patient:** Majority of the patients were males. Only 10 were females in our study.

Table 2

Sex	No. of patients	Percent
Male	38	79
Female	10	21

3. **Indications of the bera:** Following are the indications for BERA in the present study.

Table 3

Indication	No. of patients
Assessment of residual hearing for surgical correction	10
Poor speech and delayed milestones	34
Cerebral palsy and mental retardation	2
For selection of hearing aids	12
Issueing disabilty certificate	24

4. **Hearing loss:** Out of 48 patients, 5 patients were found to have normal hearing as BERA showed normal responses. In 43 patients, BERA showed Mild to severe sensorineural hearing loss. 12 patients showed severe deafness, who were given hearing aids.

Table 4

Hearing loss	No. of patients	Percent
Normal	5	10
Mild hearing loss	26	54
Moderate hearing loss	5	10
Severe hearing loss	12	26

Discussion
BERA responses (particularly the absolute and interpeak latencies) represent a series of potentials corresponding to sequential activation of the peripheral (acoustic nerve and pontomedullary portion) and central (pontine and midbrain) portions. Prolongation of absolute latencies and inter peak latencies are indicative of delayed conduction in brainstem auditory pathway. BERA is very useful in early detection of hearing loss and planning rehabilitative procedures. In case of multiple handicaps, it is the only test which can give accurate picture of hearing sensitivity. In cases of high risk babies BERA should be carried out as a routine procedure to detect hearing loss. These tests help to conclude regarding the cause of delay in speech and language development. It is the only tool which can confirm the normal sensitivity of hearing whenever required [7].

In 48 cases where the free field assessment had shown a suspected hearing loss and BERA was requested in order to confirm and assess accurately the hearing impairment, BERA confirmed the hearing loss in 43 children. We found that 46% of referred children belong to age group of 2-5 years while only 54 % belong to 0-2year. However inspite of delay in referrals these children may still be benefitted by rehabilitative measures without which they are at risk for a significant delay in receptive and expressive skills. A further research is required with elaborated sample size to specify methods to quantify their yield as components of early assessment programmes and to assess the clinical significance of various patterns of abnormality in relation to risk factors, developmental sequelae and differential management decisions [8]. It appears that BERA is at present the most useful audiometric tool for early hearing evaluation and can contribute a great deal to early hearing loss detection and management. In our experience BERA has been proved to be useful in determination of hearing threshold in children with suspected hearing loss. The assessment of hearing level in severely handicapped or mentally retarded children is not possible by any other means. One would not advocate that the BERA is the most important single investigation in all cases of suspected hearing loss, but it definitely improves the degree of certainty in diagnosis and assessing deafness in such children. It can also be used in assessing the hearing threshold and maturity of central nervous system in children below the age of five years, especially in those between 0-2 years old. We have found that the BERA has been a valuable and reliable diagnostic tool in management of children with hearing loss if its limitations and the parameters used are taken into account when interpreting its findings. Moreover awareness amongst the peripheral health practitioners about the potentials of BERA in early diagnosis of hearing loss should be encouraged [9].

Conclusion
BERA is the diagnostic tool for identifying suspected hearing loss and in the management of hearing loss in children from primigravida. Early identification of the children and their rehabilitation with hearing aids is the greatest advantage.

Conflict of interest
Authors state no conflict of interest.

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