ORIGINAL RESEARCH

EVALUATION OF AUDITORYBRAIN STEM EVOKED RESPONSE IN MIGRANE PATIENTS IN A TERTIARY MEDICAL CENTER, TAMILNADU

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ABSTRACT

Background: Migraine is the second most common type of primary headache and is characterized by complex sensory dysfunction .It occur s in both the sexes but it is higher in females.It is second common type of primary headache. Thus the aim of the study is to To evaluate the auditory brain stem evolved response in migraine patients and to compare with the normal subjects. **Aim:** To evaluate the auditory brain stem evolved response in migraine patients and to compare with the normal subjects. **Methods:** The study was conducted in the Department of Physiology, Chengalpat Medical College, Chengalpat, Tamil Nadu. It is a case control study design.The study period was 2023-2024. The data was collected using a predesigned and pretested questionnaire. Detailed history like name, age, sex, residence were noted. Routine clinical examination was performed. Rinne's ,weber and pure tone audiometry was conducted. Following the BERA was done by using 'Neruoperfect EMG-2000(EMG/Ncv/EP) System. The collected data will be entered in the MS excel sheet Windows 10.The analysis was done using SPSS 23. **Conclusion:** Our study concludes that there is involvement of brainstem in the migraine patients.The auditory brainstem evoked responses can be used as an non invasive,reliable and diagnostic method .It also works an earliest indicator for the impeding auditory involvement in the migraine patients.

Key words: Migraine, Latency, Brainstem, Headache, neurological symptoms.

INTRODUCTION

The most common neurological symptom which is encountered is Headache.This headache occurs due to many causes like irritation of pain sensitive intracranial structures like upper cervical nerves,intracranial portions of trigerminal,large arteries and venous sinuses and dural sinuses.Ependymal lining of ventricles,Brain parenchyma and choroid plexus are insensitive to pain (1,2).The headaches are classified into Primary headache and secondary headache. Headaches which occur without an exogenous cause is known as primary Headache. Headache which results due to the structural brain disease is known as secondary headache. Migrains,Cluster headache and Tension type headache are some examples of Primary headache(3).

Migraine is the second most common type of primary headache and is characterized by complex sensory dysfunction..It is episodic .It occurs at any age group and females tends to get more affected than males.Family history also has a positive impact(4,5).clinical examination on migrane patients was found to be normal.Electophysiological and

Psychophysical tests are done in migrane patients(6).The potential activity change which is caused by the sound stimulation in the brainstem auditory conduction pathway is known as Brainstem auditory evoked potential(BAEP).It is considered as an important neurological indicator.It reflects the dysfunction from the cochlea to the brainstem and peripheral nerve function.It is also used for assessing the audiology(7,8).Thus it is a atraumatic method to find the functional abnormalities.Thus the aim of the study is to To evaluate the auditory brain stem evolved response in migraine patients and to compare with the normal subjects.

MATERIALS AND METHODS

Study Setting: The study was conducted in the Department of Physiology, Chengalpat Medical College, Chengalpat, Tamil Nadu.

Study Design: Case Control study design .

Study Period: 2023-2024

Study Population

Cases

All the study participants fulfilling the criteria of migrane as per International Headache Society from the outpatient department of the institute of Neurology, Chengalpet Medical College, Chengalpet.

Control

All the study participants were matched with age and gender were compared with the cases.

Sample Size: The study samples were selected throughout the study period and the final sample size was found to be 60(30 in each group).

Inclusion Criteria

- Age betweem 20-30 years
- Migraine with and without aura atleast for a period of 6 months
- Patients with normal respiratory,heaptic and cardiovascular function
- Patients with normal hearing and normal vision
- Cooperative
- Willing to participate

Exclusion Criteria

- Known Hypertensive
- Diabetes Mellitus
- Ear disease
- Anemia
- Known smoker, alcoholic and with any medicationChronic illness
- Any other neurological illness
- Those who are on medications which affects hearing

Data Collection Methods

The data was collected using a predesigned and pretested questionnaire. Detailed history like name, age, sex, residence were noted. Routine clinical examination was performed. Rinne's, weber and pure tone audiometry was conducted. Following the BERA was done by using 'Neruo perfect EMG-2000(EMG/Ncv/EP) System.

Data Entry and Analysis

The collected data will be entered in the MS excel sheet Windows 10. The analysis was done using SPSS 23.Descriptive statistics was expressed in terms of mean values and percentages. Chi square test was done for comparison two categorical variables. Continuous variables was expressed in mean and standard deviation. Continuous variables were analyzed using unpaired t test and Anova test.

RESULT

Table 1: Baseline characteristics

Baseline	Cases	Control	P value
Age	34.03±10.33	31.20±7.15	0.22
Height	153.67±4.95	157.10±5.53	0.01*
Weight	56.57±5.01	57.07±6.19	0.73
Gender	1.93±0.25	1.80±0.41	0.13
Body mass index	23.77±2.57	22.73±2.35	0.10

In our study the baseline characteristics did not show any statistically significant.

Table 2: BERA Latency in Right ear and left ear

Latency(m/sec)	Right Ear		P value	Left Ear		P value
	Cases	Control		Cases	Control	
Lat 1	2.18±0.3	1.35±0.40	0.01*	2.18±0.3	1.35±0.40	0.22
Lat 2	2.77±0.43	2.23±0.56	0.01*	2.77±0.43	2.23±0.56	0.01*
Lat 3	4.21±0.29	3.09±0.37	0.01*	4.21±0.29	3.09±0.37	0.73
Lat 4	5.22±0.34	4.80±0.18	0.01*	5.22±0.34	4.80±0.18	0.13
Lat 5	6.14±0.29	5.01±0.31	0.01*	6.14±0.29	5.01±0.31	0.10

Latencies are found to be prolonged in migraine patients .The mean latency of migraine patients and control groups found to be statistically significant

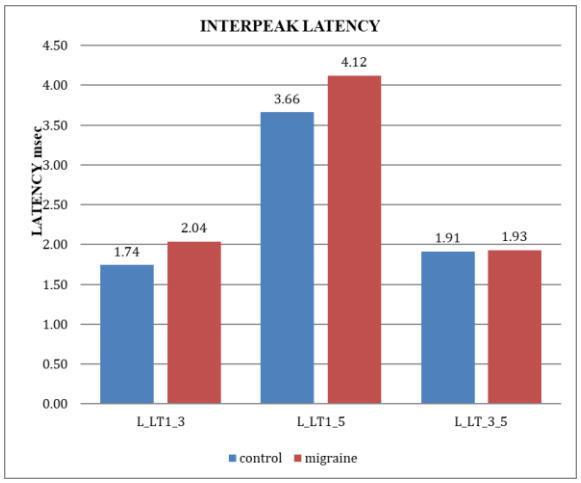

Figure1: Interpeak latency in Left Ear

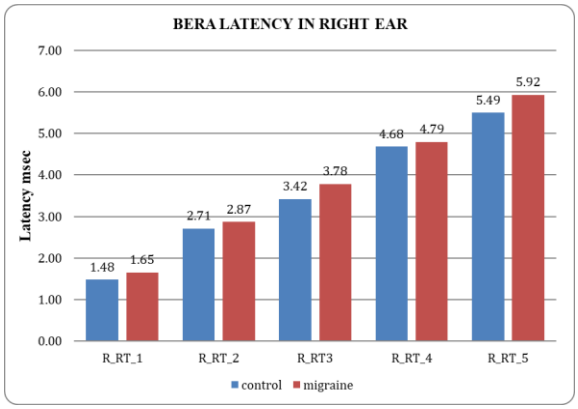

Figure 2: Intrepeak latency in Right Ear

DISCUSSION

In the present study, Brainstem auditory Evoked Potential parameters were evaluated in Migraine patients in order to find out whether cortex or Brainstem is involved in Migraine patients.

Migraine can best be explained as a 'Brain state' in which the cellular and vascular functional changes occur at the same time due to dysfunction of subcortical structures, brainstem and diencephalic nuclei that modulate sensory inputs. These nuclei act as a 'Migraine Mediator' whose dysfunction will lead to abnormal perception and activation of Trigeminal Vascular System (TVS) which then activate the central structures. Thus, Migraine is mainly due to TVS activation generated within the brain without a peripheral sensory input.

Migraine is the central sensory processing disorder, there is dysfunction of descending brainstem pain modulatory system. The hyperexcitability of the nociceptive circuitry downstream is responsible for this central sensitization in Migraine patients.

In our study there was no statistical significant difference observed between the mean age, sex, height, body mass index of study and control group

. In this present study BAEP reports showed significant prolongation of I,III and V interpeak latency of wave I-III&I-V but no prolongation is observed in the interpeak latency of wave III-V in migraine when compared with controls.This results is supported by study done by D Kaushal, S Sanjay Munjal, M Modi, N Panda et al (9). The results stated that prolongation in wave I, III & V latencies and I-III & I- V interpeak latencies and revealed that prolongation was due to involvement of Brainstem structures as well as activation of brainstem in Migraine patients. These results were in accordance with our present study. Similar results were obtained in another study in which prolongation of interpeak latencies I-III, III-V, I-V were reported in Migraine patients Bayazit Y, et al (10)

Laila EL Mosly et al. (11) did a study and reported that there was prolongation of wave III& wave V latency and I- III & I- V interpeak latency due to hyperexcitability of the cerebral cortex but no significant change in III – V interpeak latency both during an attack and in the interictal phase among migraine patients. These results were similar with our present study.

Anil K Dash et al .(12) did a study and the results revealed that there was significant prolongation in latencies of wave I, III & V and interpeak latencies I-III , III-V & I-V. This study concluded that BAEP abnormalities are the earliest indicator of impending auditory involvement in patients with Migraine. These results were consistent with our present study.

Sherifa A Hamed, Amal Mohammed Elatter et al (13) did a study and the results were reported that the prolongation in wave III latency and I-III, III -V& I -V interpeak latencies. This study suggests that in Migraine, there is permanent vestibular damage either peripheral or central vestibular pathways. Similar results were observed in our study.

Yang Y, Li P, Ye HC -Explored personality test and BAEPs in 30 Migraine patients(14) They reported that the latencies of wave I , III & V and the Interpeak latencies of III- V were prolonged and related this prolongation to brainstem dysfunction. Similar results were observed in our study.

Firat Y et al (15) in his study measured auditory brainstem responses in pediatric population during the period of an attack and asymptomatic period of Migraine. There was prolongation of wave V and I –V Interpeak latency in Migraineurs. These changes were due to transient impairment of auditory brainstem function in Migraine patients. These results were in accordance with our present study.

Drake ME et al (16) in his study found that there was significant prolongation of I – V and III- V interpeak latency in Migraine patients. This study suggests that prolongation was due to dysfunction of brainstem

centers and possibly related to endorphin or serotonin neurotransmission.

Zgorzalewicz M et al(17) in his study reported significant prolongation in latencies of wave III in Migraine children when compared with TTH. This study suggests that brainstem contributes to the pathophysiology of Migraine. Present study shows the involvement of Brainstem structures during migraine attack. Prolongation of interpeak latencies supports the Brainstem activation theory of migraine. Appearence of photophobia in patients with migraine may be related to the disturbances of brainstem functions.

CONCLUSION

Our study concludes that there is involvement of brainstem in the migraine patients. The auditory brainstem evoked responses can be used as an non invasive,reliable and diagnostic method .It also works an earliest indicator for the impeding auditory involvement in the migraine patients. There is prolongation of latency I, III and V which is statistically significant. Prolongation of interpeak latency of I-III and I-V is statistically significant and it reveals that the prolongation is due to involvement of brain stem structures as well as activation of brain stem in migraine patients. Prolongation of interpeak latency supports the brain stem activation theory of migraine.Auditory brainstem evoked responses can be used as an effective tool making neurophysiological evaluation of the Auditory pathway.

Limitations

The sample size is small .The study is a single centre study so the results cannot be generalized.

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Competing Interest

There is no competing interest

Authors Contribution

All authors in our study contributed to the data collection of the patients

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