TO INVESTIGATE THE RELATION BETWEEN PATTERN REVERSAL VISUAL EVOKED POTENTIAL PARAMETERS AND ANTHROPOMETRIC PARAMETERS (HEIGHT. WEIGHT, BMI AND BSA) IN YOUNG HEALTHY SUBJECTS

Physiology

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ABSTRACT

Background: The visual evoked potentials refer to the change in brain activity when we apply intermittent visual stimulus to visual system. Visual evoked potential provide a quantitative measures of the functional integrity of the visual pathway. The present study was done to investigate the relation between pattern reversal visual evoked potential parameters and anthropometric parameters (Height, weight, BMI & BSA) in healthy subjects. Only few baseline studies have been conducted in India

Material and Method:- Monocular pattern reversal visual evoked potential was recorded using a standard protocol in randomly selected 120 healthy volunteers of Haryana population within the age group of 18 to 25 year. Latencies of various waveforms were calculated and effect of various anthropometric parameters including age, height, weight, BMI, BSA and Head circumference and BSA were studied.

Results:- The present study showed the difference in latency and amplitude of VEP between male and female indicating gender is an important variable affecting the VEP. Significant positive correlation found between BMI, weight, height and P100. No relation observed between BSA and VEP.

Conclusion:- Significant positive correlation found between BMI, Weight, height and P100

KEYWORDS

Visual Evoked Potential, Body mass index, latencies, N75, P100, N145

INTRODUCTION

Evoked potentials permits conduction velocity assessment of sensory impulses in central [1] as well as peripheral nervous system [2]. Visual evoked potential provide a quantitative measures of the functional integrity of the visual pathway. VEP is affected by physical [3-6] and physiological parameters [7-13]. The present study was done to investigate the relation between pattern reversal visual evoked potential parameters and anthropometric parameters (Height, weight, BMI & BSA) in healthy subjects. Only few baseline studies have been conducted in India

MATERIAL AND METHOD

A cross sectional study was conducted over a period of 1 year after taking approval from the institutional ethical committee and written consent of subjects in the electrophysiology laboratory of Physiology department, Faculty of Medicine and Health Sciences SGT Medical College Hospital and Research Institute SGT University, Gurugram. Total 120 healthy volunteers of both sexes within the age group of 18 to 25 year with normal pupil size, the field of vision and fundus were included in the study. The anthropometric parameters including age, height, weight, BMI, and BSA were recorded in all the subjects.

Methodology used was standardized as recommended by the International Federation of Clinical Neurophysiology (IFCN) committee[14] and International Society for Clinical Electrophysiology of Vision (ISCEV) [15] using 10-20 International system of EEG placement and Fz-Cz-Oz method. VEP was recorded with two channel, PC based, NEUROSTIM-NS2 machine of Medicaid firm with standard silver silver chlorides disc electrodes. The VEP parameters recorded were latencies to N70, P100 andN145 waves, and peak to peak amplitude of P100 wave.

Statistical analysis

The data was analyzed by using Students unpaired t test to compare the results in selected group and p-values were obtained. After that correlation was done between VEP and Head Circumference by using Pearson's coefficient 'r'. The statistical analysis was carried out with SPSS PC software version 13.0

OBSERVATIONS AND RESULTS

Height Correlation with VEP parameters

We evaluated the correlation of height with VEP parameters. Significant correlation was observed between P100 latency and height in both eyes. Positive but nonsignificant correlation was observed between height and N75 latency, N145 latency and with N75-P100 amplitude values.

Table -1: Showing Correlation between Height and VEP parameters in Right eye.

Parameters	Mean±SD	R	P
Height	166.43 ± 7.85	-	-
N75 latency (ms)	82.85 ± 5.26	0.110	>0.05
P100 latency (ms)	108.12 ± 7.4	0.382	<0.05
N145 latency (ms)	145.04 ± 10.62	0.168	>0.05
N75—P100 amplitude(μv)	4.846± 2.01	0.101	>0.05

Table -2: Showing Correlation between Height and VEP parameters in Left eye.

Parameters	Mean±SD	R	P
Height	166.43 ± 7.85	-	-
N75 latency (ms)	83.00±5.28	0.168	>0.05
P100 latency (ms)	108.39±7.90	0.445	<0.05
N145 latency (ms)	143.96±10.83	0.205	<0.05
N75—P100 amplitude(μv)	4.63±2.13	0.046	>0.05

Weight Correlation with VEP parameters

Significant correlation was observed between weight and P100 latency in both eyes while positive but non-significant correlation of N75 latency, N145 and N75—P100 was seen. Clinically P100 wave is considered to be of important value as it is consistent and easily identified. Our results showed significant correlation between weight & P100 value.

Table -3: Showing Correlation between Weight and VEP parameters in Right eye.

Parameters	Mean±SD	R	P
Weight	62.49 ±11.67	-	-
N75 latency (ms)	82.85 ± 5.26	0.137	>0.05
P100 latency (ms)	108.12 ± 7.4	0.410	<0.05
N145 latency(ms)	145.04 ± 10.62	0.151	>0.05
N75—P100 amplitude(μv)	4.846± 2.01	0.037	>0.05

Table - 4: Showing Correlation between Weight and VEP parameters in Left eye.

Parameters	Mean±SD	r	P
Weight	62.49 ±11.67	-	-
N75 latency (ms)	83.00±5.28	0.234	>0.05
P100 latency (ms)	108.39±7.90	0.459	<0.05
N145 latency (ms)	143.96±10.83	0.467	<0.05
N75—P100 amplitude(μv)	4.63±2.13	0.048	>0.05

BSA (Body Surface Area)Correlation with VEP parameters

A non-significant correlation of BSA with VEP parameters(N75, P100, N145 latencies and N75-P100 amplitude) was found in both eyes.

Table -5: Showing Correlation between BSA and VEP parameters inRight eye.

Parameters	Mean±SD	r	p
BSA	1.77±1.41	-	-
N75 latency (ms)	82.85 ± 5.26	0.028	>0.05
P100 latency (ms)	108.12 ± 7.4	0.088	>0.05
N145 latency (ms)	145.04 ± 10.62	-0.012	>0.05
N75—P100 amplitude(μv)	4.846± 2.01	0.027	>0.05

Table -6: Showing Correlation between BSA and VEP parameters in Left eye.

Parameters	Mean±SD	r	p
BSA	1.77±1.41	-	-
N75 latency (ms)	83.00±5.28	0.106	>0.05
P100 latency (ms)	108.39±7.90	0.102	>0.05
N145 latency (ms)	143.96±10.83	0.195	>0.05
N75—P100amplitude (μv)	4.63±2.13	0.136	>0.05

BMI (Body Mass Index) Correlation with VEP parameters

A significant positive correlation observed between BMI and P100 latency in both eyes. Non-significant correlation was observed between N75 latency, N75—P100 amplitude and BMI in both eyes

Table -7: Showing Correlation between BMI and VEP parameters in Right eye.

Parameters	Mean±SD	r	p
BMI	19.52±3.13	-	-
N75 latency (ms)	82.85 ± 5.26	0.161	>0.05
P100 latency (ms)	108.12 ± 7.4	0.247	<0.05
N145 latency(ms)	145.04 ± 10.62	0.167	>0.05
N75—P100 amplitude(μv)	4.846± 2.01	0.001	>0.05

Table -8: Showing Correlation between BMI and VEP parameters in Left eye.

Parameters	Mean±SD	r	p
BMI	19.52±3.13	-	-
N75 latency (ms)	83.00±5.28	0.231	>0.05
P100 latency (ms)	108.39±7.90	0.290	<0.05
N145 latency (ms)	143.96±10.83	0.400	<0.05
N75—P100 amplitude(μv)	4.63±2.13	0.001	>0.05

DISCUSSION & CONCLUSIONS

In our study, we found statistically significant positive correlation between P100 and height & positive but non–significant correlation between N75 latency, N145 latency and height .A negative correlation between height and N75-P100 amplitude was observed. A significant correlation was reported between height of subject and axial eye length in a previous study. This may influence the VEP parameters as because of that the length of optic nerve between the optic nerve head and the visual processing area increases[16,17,18].As per our observations and results we agreed with these studies.

Significant positive correlation was observed between weight and P100 in both eyes. Significant positive correlation was observed between weight and N145 in the left eye. Reason behind this significant result may be considered as weight increases in linear with increase in height and head size. This may leads to increase in optic nerve length and that may influence VEP parameters. Body surface area was found statistically nonsignificant correlated with VEP parameters. The correlation of BMI with P100 was found statistically significant in our studies. Few studies were found in relation to weight, BMI and BSA. The finding of other studies are in agree with our findings. Various studies also tried to evaluate the effect of height, weight, Body Mass Index (BMI), Body Surface Area (BSA). Solanki JD et al. (2015) studied the "Visual Evoked Potential: Head size, sex, and BMI" and observed A small statistically insignificant correlation between weight, BSA, and VEP latencies was observed [19].Our findings are different from solanki's findings. It may be due to small group size in their study.

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