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Research Article

Retinal Screening of Prolactinoma Patients Using Flash Electroretinography

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Abstract

Aim: Prolactinoma is the most pituitary adenomas that affect young women at fertile age. Visual impairment is a common presentation of this condition. Retina is a part of visual system may be affected in these patients. Flash electroretinography is one of the techniques to screen the retina. The aim of present work is to search for probable adverse effect of prolactinoma on retina using flash electro-retinography.

Patients and Method: Fifteen female patients (30 eyes) with age range of 20-40 years were selected. The patients had healthy visual system as for as visual

acuity, field of vision and magnetic resonance imaging of brain were concerned. The amplitude and latency of electroretinogram b-wave was recorded for these patients and 15 age and sex matched controls with healthy visual system.

Results: The mean age was 29.4±6.68 and 29.13±6.82 in case and control groups respectively. The mean visual acuity was 0.00±0.00 (LogMar) in both groups. The difference in values were not statistically significant as far as age (P = 0.967) and visual acuity (P=1) were concerned. The values obtained for amplitude were 113.93 ± 9.14 and 114.4 ± 6.83 in case and control groups respectively. On other hand the values for latency were 34.13 ± 1.56 and 34.13 ± 1.65 in case and control groups respectively. The values for ERG were not statistically significant as for as amplitude and latency (P = 0.682 and P = 0.925 respectively) of ERG, b-wave were concerned.

Conclusion: Prolactinoma does not affect retina of the patients as for as flash electroretinography is concerned.

Keywords: Prolactinoma; Retina; Flash electroretinography

1. Introduction

Prolactin is a hormone made by the pituitary gland, a small gland at the base of the brain. Prolactin causes the breasts to grow and make milk during pregnancy and after birth. Prolactin levels are normally low for men and non-pregnant women, but its level may increase during pregnancy and amenorrhea. Increase in prolactin or Hyperprolactinemia includes the symptoms such as infertility, oligomenorrhea, headache, breast tenderness, galactorrhoea, sexual dysfunction, visual field defects and etc. [1] Prolactinomas may affects the visual system. Vision loss, visual field defects, double vision, eyelid dropping and enlarged pupil are among the ocular problems observed in these patients. [2-5] Visual pathway mainly optic nerve, chiasma or optic tract is a part of visual system that maybe affected in this connection too. [6, 7] There are several diagnostic techniques to reveal the visual pathway disorders. Magnetic resonance imaging or MRI is an imaging technique which is mostly used in this respect [8, 9].

In a recent work Shahrzad Keramti and her colleagues on 2021 worked on fifteen female patients with prolactinoma. They came to conclusion that prolactinoma might have adverse effect on visual pathway mainly optic nerve despite normal visual acuity, field of vision and brain magnetic resonance imaging which can be diagnosed by latency of VEP, P100 peak of pattern reversal visual evoked potential [10].

The research team observed one or two patients with retinal disorder despite normal retinal fundus. Therefore they suspect that prolactinoma might have adverse effect on retina along with visual pathway disturbances, on reviewing they come to an extensive work which was done on retinal layers in prolactinoma patients using spectral- domain optical coherence tomography. The authors evaluate the thickness of chorioretinal layers in patients with prolactinoma. They enrolled 63 eyes of 32 prolactinoma patients and 36 eyes of 18 age and gender matched healthy controls. None of the patients

had visual field defect. They concluded that the thickness of chorioretinal layers in patients were thinner than the control group [11]. Base on this reference and some other findings the authors planned to screen the retina of the patients by flash type of electroretinography.

2. Patients and Methods

In this case control study fifteen female patients (30 eyes) with prolactinoma were selected as the case group. They were in age range of 20-40 years. The patients were tested for visual system i.e., visual acuity, perimetry and brain magnetic resonance imaging (MRI) which were all normal.

Electroretinography using flash type of stimulation was recorded in all patients. Latency (m sec) and amplitude (μv) of ERG, b- wave were measured for each subject. Mangoni machine capable of recording electrophysiological techniques was used to record ERG. Conventional electrode attachments were used for attaching the electrodes to the subjects. Mean and standard deviation of latency and amplitude of ERG b-wave in the case and control groups were calculated. We preformed the statistical analysis using spss software version 22 (IBM, Armonk, NY, USA). P values less than 0.05 were considered statistically significant.

3. Result

Table 1 shows the demographic findings in the case and control groups and there is no statistically significant difference between the two groups regarding the age (P=0.967) and visual acuity (P=1).

Variable	Number of participants	groups (Mean ± SD)		P value*
		Control	Case	
Age	15	29.13 ± 6.82	29.4 ± 6.68	0.967
Visual Acuity (LogMar)	15	0.00 ± 0.00	0.00 ± 0.00	1
* Based on Mann-Whitney U Test				

Table 1: Demographic findings in the case and control groups.

Variable	Number of participants	groups (Mean ± SD)		P value*
		Control	Case	
Amplitude (μv)	15	114.4 ± 6.83	113.93 ± 9.14	0.682
Latency (msec)	15	34.13 ± 1.65	34.13 ± 1.56	0.925
* Based on Mann-Whitney Test				

Table 2: Measurement of mean amplitude and latency of ERG, b-wave in control and case groups.

Table 2 shows the measurements of mean amplitude and latency of ERG, b-wave in the control and case groups. There is not statistically significant ERG as far as amplitude (P=0.682) and latency (P=0.925) of ERG, b-wave is concerned.

4. Discussion

Prolactionoma is a disease of pituitary gland which may affect visual system too. Research was planned to look for probable pathological changes in retina of these patients using flash electroretinography (FERG). According to result of present study we could not observe significant changes in control and case groups as for as demographical aspect, i.e., age, sex and visual acuity were concerned. ERG results in two groups also did not show any significant changes as for as amplitude and latency of ERG, b-wave were concerned (P = 0.682 and P = 0.925 respectively). The result of present work may be discussed as follows.

In fact, prolactinoma mostly have adverse effect on visual pathway mainly optic nerve, for which visual evoked potential is a suitable electrophysiological technique for its diagnosis [10] and it is a reason that the retinal study in prolactinoma patients is relatively scarce; however there are few references in this regard which will be reviewed as follow. In an elaborative work done by Ewelina Lachowicz and et al on 2018 about the importance of electroplysiological test in the early diagnosis of ganglion cells and/or optic nerve dysfunction coexisting with pituitary adenoma they reported the usefulness of pattern electroretinogram (PERG) for visual outcome in assessment of optic nerve compression by the pituitary tumour. This is among the few references deals with electroretinography in prolocationoma patients. In this reference pattern type of ERG (PERG) is used which deals with ganglion cells dysfunction coexisting with pituitary adenoma [12]. Where as we used flash type of ERG, and b-wave measurement which reflects the function of Bipolar and Muller cell of retinal layers [13] which is intact in these patients.

Another work done by Hayder Al- Hasani & his colleagues on 2018 reported a 45 year old male, with a long- standing history of retinitis pigmentosa, presented with rapid vision loss over 3 months. Examination revealed a severe drop in visual acuity and significant progression of concentric visual field constriction in each eye compared to 3 months prior. Magnetic Resonance Imaging (MRI) revealed a pituitary macroadenoma compressing the optic chiasm [14]. It is a well-known fact that flash electroretinography is a suitable technique to diagnose the retinal status of RP patients so this technique can be used in prolactinoma patients with underlying retinal disorders [15]. There by flash type of ERG may be useful in prolactinoma patients with underlying retinal disorders.

5. Conclusion

Prolactinoma does not affect retina as for as flash type of electroretinography is concerned, i.e., the Bipolar and Muller cells are intact in these patients.

Conflicts of Interest

The authors have no conflict of interest with the subject matter of this manuscript.

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