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Reversal visually evoked potential (VEP) may reflect abnormalities in diabetes-II subjects:

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Abstract: *This VEP is clinically practiced as non-invasive ophthalmic electro diagnosistesting.This is to be used for prognosis, diagnosis and clinical follow-up procedures.Aim/purpose: a group of diabetes type-II with clinically apparent normal fundus has been chosen for purpose to assess the clinical value of such non-invasive reversal-VEP testing for clinical prognosis eventually diagnosis of possible visual system and ocular pathologies in this group of subjects, also to encourage clinicians to apply reversal-VEP in clinical practice.*

Keywords: *reversal, VEP, latency, amplitude, peak to peak, wave-form, grand-average.*

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I. Introduction And Aim :

The recording of the spontaneous electrical activity of the brain from electrodes placed on the intact scalp has been practiced as a "clinical routine" for many years. The visually evoked potential (VEP) is one of several evoked potentials which can be recorded from scalp electrodes (Galloway,1981).

VEP can be defined as the averaged or summated cortical activity which is evoked by visual stimulation and recorded from intact scalp. This recording is clinically practiced as non-invasive ophthalmic electro diagnosistesting. This is to be used for prognosis, diagnosis and clinical follow-up procedures. This will help significantly in cost-effective management, treatment and time saving in starting early clinical treatment.

VEP reflect the conduction conditions of the visual pathway from the retina up to the visual cortex, allowing the study of central cones and macular bundle. There are different types of VEP-recording depending on stimulation modes, among others, flash/luminance-VEP, appearance/disappearance-VEP, and reversal-VEP…mode of stimulation can be/ may be white and coloured stimulation modes.

Figure 1 A, B Normal reversal VEP

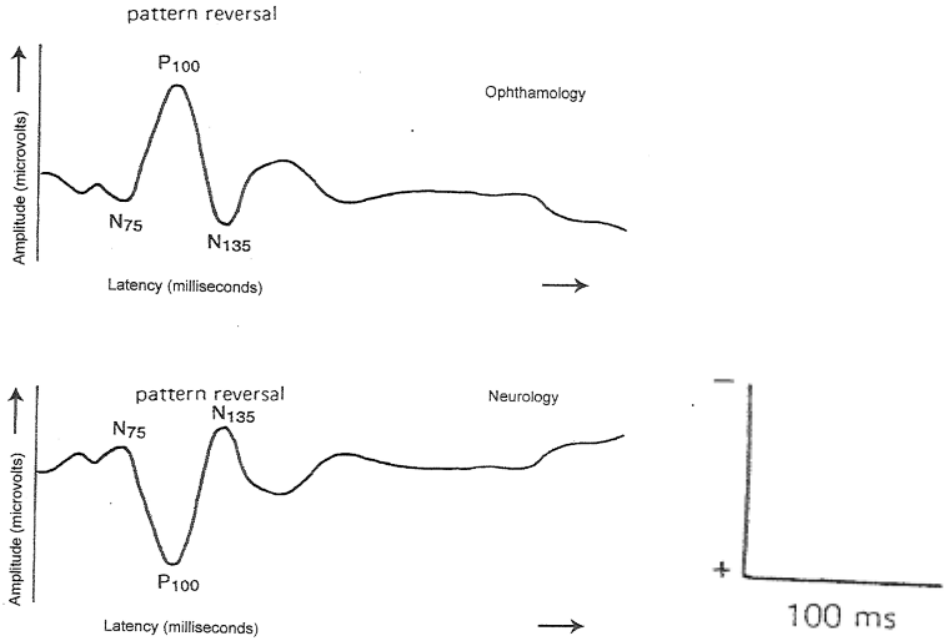


Figure1: the visual evoked response to pattern reversal is shown recorded from a normal subject. The responses in this case are shown recorded from each occiput and referred to the midfrontal electrode Fz.

Reversal VEP is based on contrast stimulation (mode) of the eye, maturated early during life-time. P100 is the common parameter to be considered during recording reversal VEP as it is the indicant for any possible conduction abnormality within the visual pathway,Reflective errors, optical media clarity and hemogeniousity may influence reversal-VEP findings in clinical practice.

Diabetes occur either because of lack of insulin or because of factors that oppose the action of insulin. The result of insufficient action of insulin is an increase in blood glucose concentration (hyperglycemia). Primary diabetes mellitus is two types; insulin dependent diabetes (IDDM) type-I, and non-insulin diabetes (NIDDM) type-II. This division is clinically important for treatment and understandings diabetes.

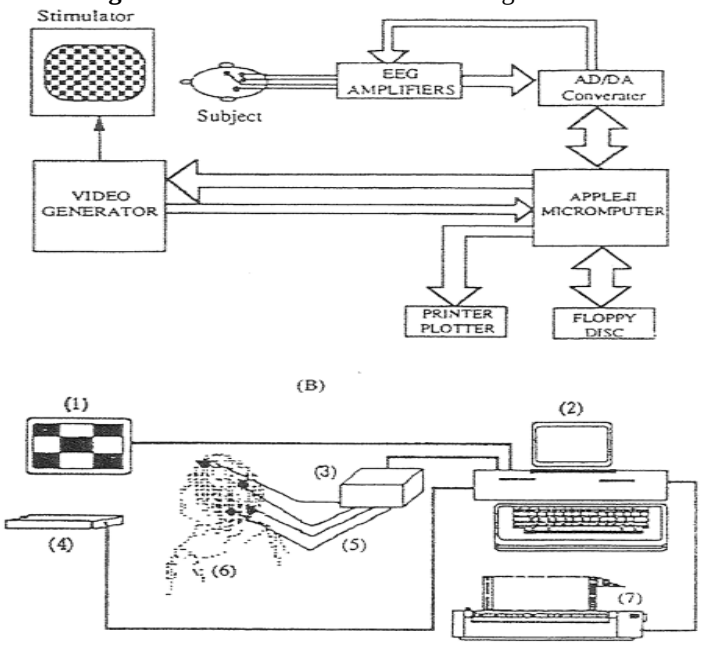
AIM/PURPOSE:a group of diabetes type-II with clinically apparent normal fundus has been chosen for purpose to assess the clinical value of such non-invasive reversal-VEP testing for clinical prognosis eventually diagnosis of possible visual system and ocular pathologies in this group of subjects, also to encourage clinicians to apply reversal-VEP in clinical practice.

II. Procedures And Method:

A group of 15 (fifteen, thirty eyes) diabetes type-II subjects aged between (48 to 55 years) has been selected clinically and carefully. Clinical ocular examinations have performed in a systematic way; visual acuity, visual field, and ocular tension testing, also slit-lump (biomicroscopy), direct and indirect ophthalmoscopy have been applied in careful clinical intake-procedure.

A clinical reversal-VEP according to ISCEV-STANDARDS intake-procedure has been performed to each subject separately in the morning sessions. Checker-boards sizes are 15, 30, and 60minute-degrees have been used, latencies, amplitudes and wave-formes have been recorded and out coming data have registered carefully for N70.15, and N70.30, and N70.60, same for P100, 15, 30, and 60, also for amplitudes , peak to peak value, pkpk for 15, 30, and 60 minute-degrees.

Figure 2 schematic over-view of testing mechanism



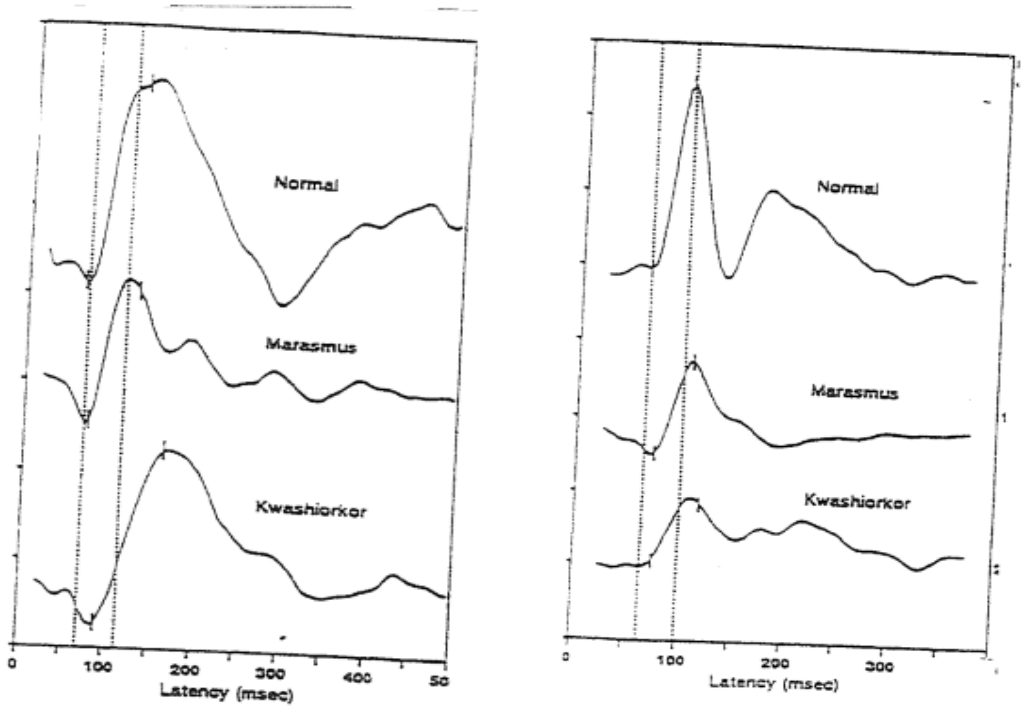
1. Stimulator, 2. Computer, 3. Amplifier, 4. Photocell, 5. Electrodes, 6. Subject,
7. Printer.

Grand average for reversal-VEP records have been drawn/ estimated graphically for all wave forms to compare to normal reversal-VEP records for easy visual inspections.

III. Results:

Significant and lengthy records-data have been collected for each subject. Due to clinical application, the data has been processed in a very simple manner. This to make it an easy intake procedure to enhance and encourage clinicians for clinical applications of reversal-VEP in clinical daily practice.

Figure 3 A, B Grand average A. normal, B. diabetes



A. Diabetes B.Normal

Average age is 51.6 years. Average visual acuity is for all subjects is 0.8 according to SNELLEN visual acuity testing.

Average value of reversal-VEP:

1. Latencies: (N70) for

Diabetes: N70.15 = 74.7msec, N70.30 = 73.6msec, N70.60 = 72.8msec

Normal: N70.15 = 68.8msec, N70.30 = 65.15msec, N70.60 = 70.2msec

P-values as compared to normal are:

Diabetes: P100.15 = 115.4msec, P100.30 = 118.3msec, P100.60 = 114.7msec

Normal: P100.15 = 105.3msec, P100.30 = 100.1msec, P100.60 = 103.6msec

2. Amplitudes:

Peak to peak amplitude:

Diabetes: pkpk.15 = 8.61uv, pkpk.30 = 10.86uv, pkpk.60 = 9.41uv

3. Wave-forms:

Wave-forms of reversal-VEP of diabetic-II subjects show a light change especially in late stages of the response records in N135. It is not significant but it is indicative for possible hidden clinical changes in the ocular system.

IV. Discussion:

In this study it was found that a reversal-VEPs response for diabetes type-II has variations as compared to normal responses in all measures. Check-sizes 15', 30', 60'minute-degrees stimulation responses have shown variation in latencies, as a clinical common parameter, for P100.15', P100.30' and P100.60'as compared to normal with p-value of P=0.01 (±0.07) and P=0.02 (±0.017) respectively.

Amplitude is an individual parameter therefor can not be used for group comparison. It can be used only in individual referencing and comparison. Anyhow the mean amplitude value shows a reduction in average, amplitude may assess objective visual acuity.

Visual inspection of response wave-forms generally are similar without big variations although the late-response may shows some variations in N135 response wave-forms.

Fluctuation of glucose level in the blood of diabetes subjects between hypoglycemia and hyperglycemia may affects significantly the clarity parts of the optical media, thes are the aqueous, the lens, and vitreous. This may leads to stray-light when light enters the eye. Stray-light reduces retinal contrast leading to reduction of visual acuity this is may be the reason why mean amplitude is reduced in average as compared to normal subjects. Also diabetes may have blood circulation fluctuation in the eyespecially in micro retinal vessel

pathway. The whole complex may play a role in the response wave-forms disturbances evident by visual inspections.

Reversal-VEP as non-invasive technique may be and can be used clinically to prognose possible damagein the visual system which may occur in the seeing time. Also it can be/may be used for follow-up to trace the fluctuations in vision, individual objective visual acuity, and the pathology progress as well. VEP testing can be coupled with other tests; ERGs and MULTIFOCALs to get complete significant findings necessary for clinical prognosis, diagnosis, and follow-up as well as medications monitoring.

Declaration of interest:

The authors declare that they have no conflict of interest in relation to this article.

Contributions of the authors:

All the authors participated in the realization of the article. All authors have read and approved the final version of the manuscript.

References:

[1]. N.R Galloway (MD, FRCS), Ophthalmic electrodiagnosis ISBN 085324 152 X. 1981, LLYOD LUKE 5Medical books), London united kingdom, second edition, 1981, PP.29-30

[2]. A.F HASSAN(MD.Ph.D), Eye evoked potentials in clinical ophthalmic practice,iSBN 90-74672-06-X. copy right, gronigen, the Netherlands, first edition, 2004, figure- 19, figure-23

[3]. Calvet, J, Cathala, H.P, SHERRER, J (1956) la reponse corticale et visuellede l'hommeetudiée par une methode d'integration. Comptes rendusdesseances de la société de biologie et de filials (paris), 150, 1348

[4]. Ciganek, I. (1961) the electroencephalogram response to light stimulus (evoked potential) in man. Electroencephalography and clinical neurophysiology (Montreal), 13, 165

[5]. PETER J. WATKING (MD, FRCP), ABS of DIABETES. ISBN 07279 1189 9, BMJ, united kingdom, forth edition, 1998, PP. 1-3-37

Meryem OUDBIB. " " Reversal visually evoked potential (VEP) may reflect abnormalities in diabetes-II subjects:."."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 8, 2018, pp 45-48.