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VISUAL EVOKED POTENTIAL(VEP) OR VISUAL EVOKED RESPONSE (VER).

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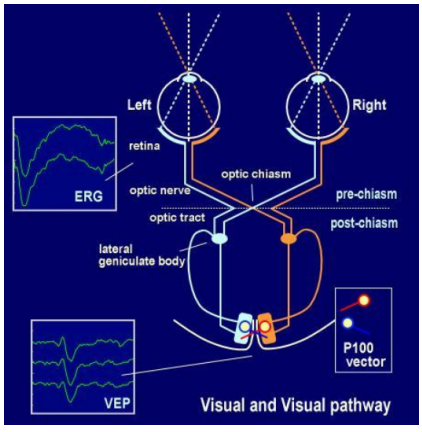
ABSTRACT It is the electrical signal recorded in response to light stimulus .Aim of this article is to review the basic procedure ,types and interpretation of VEP.It is mainly of two types Transient state VEPand Steady state VEP,the commonly used type mentioned below are Transient state.

KEYWORDS :

INTRODUCTION - It is the electrical signal recorded in response to light stimulus. It reveals the integrity of the afferent visual pathway. It mainly assesses the macular stimulation as large regions of the occipital cortex are devoted to macular projections. More sensitive for pre-chiasmatic pathway lesions.



Standard Procedure:
The patient should be conscious with eyes open and with no sedation and no distractions. The VEP takes 30 minutes to complete. Monocular testing with other eye patching from a distance of one metre is recommended. Four electrodes O-1 and O-2 are actives, Fz is the reference and Cz is the cephalic ground. One should use one's corrective glasses and focus on stimulus. Both large and small stimulus reading of 2 eyes and 2 hemispheres are compared with standardized normal values.

The Standard VEP wave:
The onset of a peak after light stimulus is called the Latency and the height of the peak is called the Amplitude. Of the two, Latency is more significant. First a negative peak N1 usually at 75 msec , then a positive peak P1 or P100 at 100 msec , then second negative wave N2 or N145.There is a second lower positive wave P2 . Maximum value of P100 is 115 msec in below 60 years, after that it rises to 120 in women and 125 in men. In newborns P190 is prominent and as the pathways develop the normal pattern is taken up. Some studies show larger amplitude and shorter P100 latency in females.

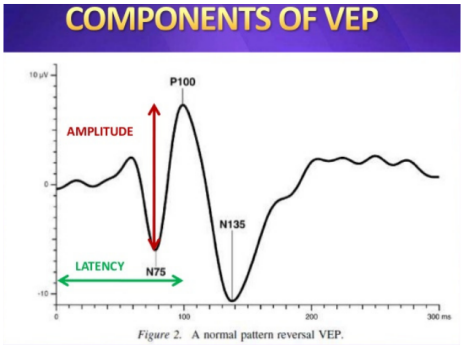


Figure 2. A normal pattern reversal VEP.

Types of VEP:
Flash stimulus – It can be performed in the infants and young children and uncooperative adults. A white flash stimulus at 5600°K is applied in a room with a background light of 0.55 lux. 150 consecutive such flashes are delivered to evaluate the functional maturation of visual pathway and cortical areas.

Pattern Reversal stimulus – Blocks of checker board (white and black) keep reversing keeping luminance same. The standard is 2 reversals per second. This is the test most commonly used.

Pattern onset offset stimulus – Blocks of checker board are on and off with time without changing luminance. During off phase there is diffuse grey background. It is useful in assessing malingering cases and patients with nystagmus.

Multifocal VEP- It is used to detect small abnormalities in optic nerve transmission along with topographic co-relation to the visual pathway. Many regions of the visual field are simultaneously recorded . Patient views a display that typically contains 60 sectors, each with a checker board pattern. Also useful in evaluating non organic vision loss and unreliable visual fields.

Abnormal VEP findings:
- Longer latency with prolongation more than 3 SD.
- Interocular difference in latency of more than 10 msec.
- Unusually high or low amplitude.
- Interocular amplitude ratio more than 2.
- Amplitude reduction of more than 50% or a latency delay of more than 15 ms in cases of opaque media like mature cataract or corneal opacity suggests visual pathway defect.

VEP Changes in Various Diseases:
- Multiple Sclerosis – It is the most common cause of prolonged P100 latency with preserved amplitude.
- Retrobulbar Neuritis – It accounts for 50% cases of sudden painless vision loss with delayed latency.
- Amblyopia – The amplitude is decreased testifying presence of transmission lesion in the retrobulbar visual pathway.
- Glaucoma – Steady- state VEP shows decreased amplitude and prolonged latency in advanced cases.
- Anterior Ischaemic Optic Neuropathy – Low amplitude but normal latency.
- Optic Nerve Demyelination – Latency of P100 is increased.
- Optic Nerve Degenerations – Non specific changes in amplitude and latency.
- Optic Neuritis – Deformed VEP wave and prolonged P100 latency.
- Neuromyelitis Optica – Decreased P100 amplitude.
- Macular dystrophy and degeneration- First latency prolonged and then diminished P100 amplitude with increased severity.
- Chaismal Misrouting as in Albinism – It causes asymmetric distribution of VEP.
- Chaismal Disorders – It causes crossed asymmetry of VEP.
- Retro-Chiasmal Dysfunction – It causes uncrossed asymmetry of VEP.
- Vitamin B12 deficiency – It causes optic nerve demyelination and prolonged latency.
- Thyroid Ophthalmopathy – It shows P100 latency prolongation.
- Compressive Nerve Lesion – Shows amplitude decrease without

much change in latency.

- Leber's Neuropathy – Initially there is increased latency with an anamolous double positive peak. With disease progression the amplitude of P100 decreases and slowly becomes flat.
- Malingering – Normal wave with no organic lesion but complaining of severe loss of vision.
- Hysterical – Variable response to VEP changing from time to time.
- Systemic conditions causing VEP changes are Arterial Hypertension, Diabetes Mellitus, Ischaemic Heart Diseases, Chronic Renal Failure, Acute Pancreatitis and Pediatric Syndrom**es.**

CONCLUSION:

VEP is being increasingly used for disease diagnosis and research purposes. One of its recent uses includes intraoperative optic nerve monitoring to avoid inadvertent nerve damage. It is also used to assess the visual status of Infants, Pediatric Syndromes, uncooperative adults, comatose patients and malingering cases. More database is required for comparison of result and report interpretation so that VEP can be used more widely in routine practice.

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