



Functional Vision Loss: The Role of Visual Evoked Potential (VEP)

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Abstract

Functional visual loss (FVL) is a decrease in visual acuity or visual field not caused by any organic lesion. It is therefore also called as "nonorganic visual loss" (NOVL). This entity is considered within the spectrum of "conversion disorder", malingering, somatic symptom disorder, and "factitious disorder" [1]. The decrease in visual acuity may involve one or both eyes and may vary from mild blurriness to complete blindness.

Keywords: Functional Visual Loss (FVL); Diagnosis; Visual Evoked Potential (VEP)

Diagnosis

The key for diagnosing FVL is thorough history taking and a meticulous complete ocular evaluation including pupil reaction, anterior and posterior segment examination to rule out any organic cause of visual loss. We must be also careful why does patient have good vision in one eye and counting finger in other with no relative afferent pupil defect?. Why did the patient see 6/60 in one visit and 6/9 in other or vice versa.

Probe into the history of the patient looking for a past medical history of any kind of depression and anxiety. Try to pin down the details of the onset of visual loss. In adults there may be trivial injury that started the process. In children there may have been a psychosocial event that acted as a trigger [2].

Some important examination can also be done such as visual acuity, visual field, physical mobility and pupil reflex test can also be performed for a diagnosis procedure.

For visual acuity testing keep encouraging the patient for the best response. Some also use the fogging technique just to ensure that you have put some number and patient feel interesting in responding his actual visual acuity. Four prism base our test can

also be performed to check whether the patient is having vision and fixation in either of the eyes when patient is denying of having vision. OKN drum can be also useful in assessing the functional vision as the standard OKN drum induces nystagmus corresponding to 20/400 vision. Menace reflex test can also be done if the patient is giving vision of NPL. Visual field can be tested with confrontation test at the same time. Even in a automated visual field test report most of the time shows constriction of field but the test also have low reliability indices, which is consistent with FVL.

The physical mobility can also give you the hint for how good vision does patient can have, carefully observe how the patient ambulates into and out of the exam room as well as how easily they find their hand to shake. They usually have no difficulties. And do document these inconsistencies in your exam. The pupil size reactivity and the presence or absence of relative afferent papillary defect (RAPD) is paramount. It is all an objective method for diagnosis of FVL and these finding in concert with the rest of the above test, observation and examination help us to pin out the diagnosis.

Functional vision loss can be identified with above clinical evaluation but however the uncertainty about the diagnosis may remain even after the neurophthalmologic examination.

Visual evoked potential (VEP)

Visual Evoked Potentials (VEPs) are electrical signals that are a measure of the electrophysiological activity at the visual cortex. VEP results are a representation of the functional integrity of all levels of the visual pathway including the retina, optic nerve, lateral geniculate nucleus, and visual cortex.

The DIOPSY VEP report can be shown on graph where the vertical axis of VEP indicates the amplitudes expressed in the microvolts. The horizontal axis is labeled with the time (latency) expressed in milliseconds. The combination of amplitude and latency is helpful in determining the health of the visual pathway. A typical pattern VEP graph response will consist of N75 P-100 and N 135 complex. In a normal healthy eye, the first major negative peak occurs around 75 ms (N75). The first major positive peak occurs around 100ms (P100) and the second negative peak around 135 ms (N135). Based on the patients eye health, the waveform shape, amplitude and latency may change.

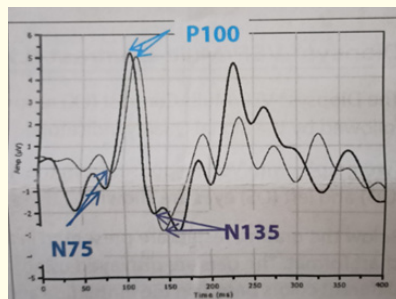


Figure 1: Graph plot of N75 P100 and N135.

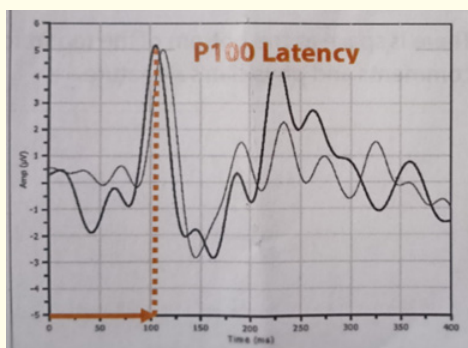


Figure 2: Graph showing P100 latency.

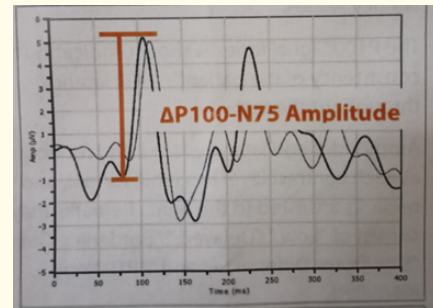


Figure 3: Graph showing Amplitude.

Standard visual evoked potential (VEP) has been used to aid in the diagnosis of functional visual loss. However pattern VEP reflects macular function.

So for confirming the visual loss of the patient who is either faking to gain disability, or with the patient who is exaggerating his visual symptoms or patient who have convinced himself that he have no vision after some trivial injury. It is not always necessary that FVL is always not associated with organic cause but may also co exist with organic cause [3-5].

Patient whose vision does not correlate with their eye health can be send for a VEP investigation. while doing pattern VEP of these patient following all the correct protocol procedure where no any organic cause have been detected then the report will show good amplitude which will indicate that the good amount of electrical energy is reaching to the visual cortex and a good amplitude also indicates ability to differentiate different size objects. If there was abnormal amplitude it would suggest number of retinal cells being affected.

These patient will show normal P 100 latency which will indicate that the time that takes the electrical signals to travel from retina to visual cortex is normal. Delayed in latency can reveal issues affecting vision if it takes more time for the electrical signals to reach the visual cortex as anything that impedes conduction of electrical signals can causes increase in latency.

So if both the amplitude and latency show normal recording where there is no significant difference in both eyes parameters

with good signal strength and less artifacts and the most important part for conclusion is reproducibility of the repeat studies then patient could be concluded with having Non organic vision loss or functional vision loss.

VEP remains as a major objective tool to rule in functional visual loss.

Below is the diagram showing the normal report of the pattern VEP.

