

Lab 10 – Electrodiagnostic Testing: the VER

OVERVIEW OF ELECTRODIAGNOSTICS

The visual system uses electrical impulses to transmit data, therefore one way to assess its health is to measure its electrical activity. The three major types of electrodiagnostic tests are summarized in the Table below. The EOG test is not done frequently, but we run the VER and ERG test on patients regularly. These are the ones we'll emphasize in lab today.

Test	What measured?	Tests ...
EOG	Electrical charge of the eye ball	Some retinal diseases (not used much)
ERG	Electrical response of the retina	Peripheral retinal diseases; RP, etc.
VEP/VER	Electrical response of area V1	Fovea to occipital pole pathways; optic neuritis, etc.

VISUAL EVOKED RESPONSE/POTENTIAL (VER or VEP)

Background

The VER tests the **electrical response of the primary visual cortex** to a visual stimulus. Since most of area V1, especially the part near the occipital pole, is dominated by foveal input, this primarily tests V1's response to **foveal stimulation**. Any anomaly between the fovea and visual cortex can interfere with the VER. This is especially useful if the patient has reduced vision, but your comprehensive eye exam reveals nothing abnormal—no refractive error and a healthy looking eye. The VER will tell you if the visual system between the retina and V1 is OK. For example, this could help you diagnose retrobulbar optic neuritis, the disease in which “the doctor sees nothing and the patient sees nothing.” It can be useful in supporting a diagnosis of malingering.

The basic VER plot is easy to interpret. Normally you expect to see the peak of a large positive wave (**P₁₀₀ wave**) at 100 ± 10 msec (see figure below). Much more than this is abnormal.

Materials

Collect the following supplies: Eye patch, head band, surgical tape, tissue paper, cotton swabs, alcohol prep pads, skin prep fluid (Omni Prep), scissors, electrode gel or fluid, electrode paste, forehead electrode, ear clip, occipital electrode.

Electrode placement

1. Forehead electrode (ground). Clean skin with the prep pad and skin prep fluid; fill electrode with gel or electrode fluid; place on forehead with cotton ball or tissue square; tape in place. Plug it into either ground.
2. Ear clip (1-). Prep skin as before, fill both sides of the electrode and clip on the ear lobe. Plug into 1-.
3. Occipital electrode (1+). Find theinion and a spot about 1 inch above it. Part the hair to expose the scalp; if necessary clip some hair so the electrode will make good contact with the skin. Prep as before, fill the electrode with paste and press into place. Cover it with a cotton ball and fix it in place with the headband. Plug this electrode into 1+.

Patient preparation

Seat the patient 1 meter from the screen and instruct him to relax and fixate the squares, which will appear on the center of the screen, when the test begins.

Computer set-up

Work through the menus to run a PATTERN VER. Enter patient data and comments. Set the number of channels to 1 and run each eye separately. Use the STEP or PARAMETERS menu to change the size of the squares.

Check the BASELINE. If the pattern appears random and well within the screen you are ready to begin the test. Select RECORD, and the test will automatically run and average 80 measurements. When finished, select AUTOSCALE - YES and STORE.

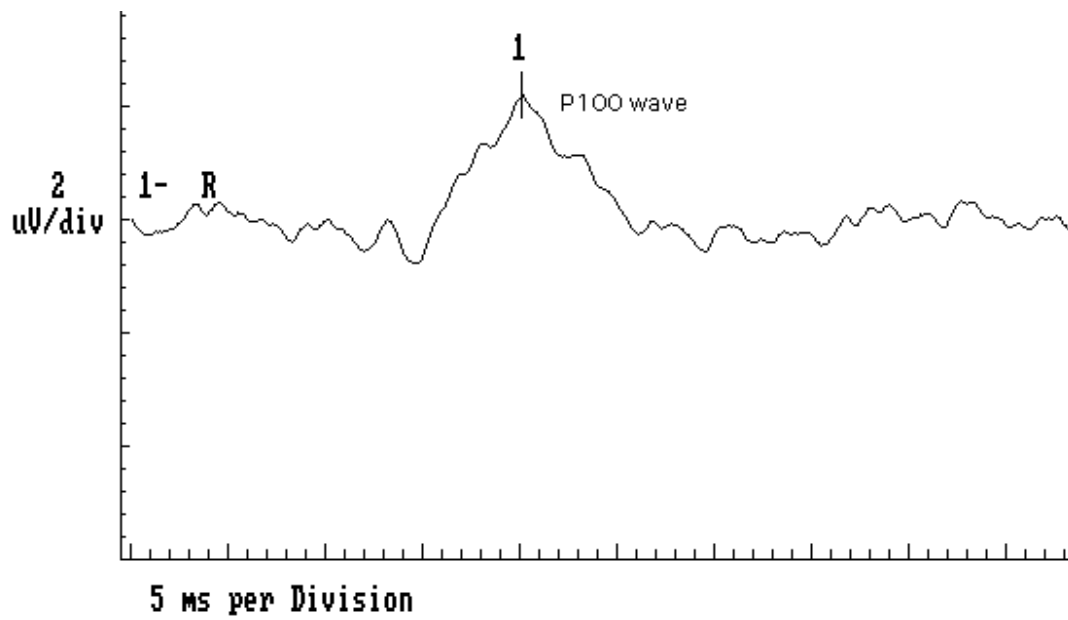


Figure 1. Typical plot of a VEG measurement.