View metadata, citation and similar papers at core.ac.uk
brought to you by CORE
provided by Elsevier - Publisher Connector

4245

VISUAL FIELD EXAMINATION VIA MOTION-ONSET VEPs

KUBA M.[1] KUBOVÁ Z.[2] KREMLÁČEK J.[1] SVĚRÁK J.[3]
Departments of [1]Pathophysiology, [2]Physiology and [3]Ophthalmology, Faculty of Medicine, Charles Uni-versity, Hradec Králové, (Czech Republic)

Purpose: In a lot of patients an objectivization of visual field defects is needed. The commonly used VEPs (pattern-reversal, pattern-onset/offset) are not helpful because of their considerable amplitude reduction outside the macula. In contrast the motion-onset VEPs that can be obtained beyond the central 40° of the visual field without significant amplitude reduction (Kuba, M. and Kubová, Z.: Doc. Ophthalmol., 80: 83-89, 1992) seem to be suitable for this purpose.
Methods: VEPs to monocular motion stimulation on 21" PC monitor (screen size of 40°x30°) were recorded from lateral occipital leads. High (95%) or low (10%) contrast patterns moved in random directions at a velocity of 5 or 10°/s for 200 ms with an 1.5 s interstimulus interval. Masking of the central part of visual field or one quadrant stimulation at various peripheral locations were used to test the residual visual function.
Results: No amplitude reduction of motion-onset VEPs and normal latency of the main negative peak N_{170} was found in control subjects when the central 40° was masked whereas a prolonged, reduced or missing motion-onset response confirmed visual field loss in patients.
Conlusions: The motion-onset VEPs can serve as an objective diagnostic tool for a detection of large visual field changes. This examination enables also to discover a subclinical magnocellular system disfunction which can be a first sign of some diseases (e.g. glaucoma).

4246

SPECIFIC LOSSES OF THE CHROMATIC PERG AND VEP IN EARLY GLAUCOMA.

PORCIATTI V.[1] DI BARTOLO E.[2] NARDI M.[2]
[1] Institute of Neurophysiology, CNR, Pisa Italy
[2] Eye Clinic, University, Pisa Italy

Purpose. Increasing anatomic evidence has suggested that large retinal ganglion cells (M-cells) are preferentially damaged in the early stages of primary open angle glaucoma (POAG), while the smaller ganglion cells (P-cells) are relatively spared. Aim of this study is to evaluate the visual function of patients with early POAG by means of the pattern electroretinogram (PERG) and visual evoked potentials (VEPs) in response to stimuli designed to favour either the M- or the P-stream of the visual pathway (patterns of pure luminance contrast or pure chromatic contrast, respectively).
Methods. Subjects were 13 patients with early POAG (good visual acuity, moderate loss of peripheral sensitivity at Humphrey 30-2 test, little or no disk cupping) and twelve age-matched controls. PERGs and VEPs were recorded in response to either red-green equiluminant gratings or yellow-black luminance gratings (0.3 c/deg, 90% contrast). Both transient and steady state responses to a range of temporal frequencies (2-24 Hz) were recorded.
Results. On average, PERGs and VEPs of patients with POAG, as compared to controls, showed significant losses for both kind of stimuli. Response to luminance gratings were mostly reduced in amplitude whereas those to chromatic gratings were both reduced and delayed. Overall, alterations to chromatic stimuli were more frequent than those to luminance stimuli.
Conclusions. The different temporal properties of the responses to patterns of either luminance contrast or chromatic contrast support the view that these stimuli favour the activity of M- and P-neurons, respectively. PERGs and VEPs of patients with POAG, as compared to controls, show losses for both kind of stimuli (although to a different extent), indicating that visual dysfunction in early glaucoma is not selective for the M-patway.

4247

MAGNOCELLULAR VISUAL DEFICIT IN DYSLEXIA - EVIDENCE FROM MOTION SPECIFIC VISUAL EVOKED POTENTIALS

KUBOVÁ Z.[1] KUBA M.[2] HROCHOVÁ J.[3] and SVĚRÁK J.[3]

Departments of [1]Physiology, [2]Pathophysiology and [3]Ophthalmology, Medical Faculty of Charles University, Hradec Králové, (Czech Republic)

Purpose Some recent studies on dyslexia (impairment of reading skills despite normal intelligence, visual acuity and motivation) have suggested a selective abnormality in the magnocellular visual pathway (e.g. Livingstone M. S. et al.: Proc. Natl. Sci. USA, 1991, 88: 7943-7947). To verify this hypothesis, we investigated motion-onset VEPs (predominantly testing the magnocellular system) as well as pattern-reversal VEPs (presumably testing the parvocellular system) in 20 dyslexics and 16 controls (both with mean age of 10.0 years).
Methods For motion-onset VEPs the pattern (black and white 40' checks) moved at a velocity of 5 deg/s for 200ms periods, with an interstimulus interval of 1s duration. For pattern-reversal VEPs, the same pattern reversed at a rate of 2 reversals/s. Binocular and monocular VEPs were recorded from the bipolar lead O_Z - C_Z and from three unipolar leads with the electrodes placed at O_Z and 5 cm to the right and to the left.
Results Whereas the latencies and amplitudes of the main positive peak of pattern-reversal VEPs did not differ between the dyslexic and control group, the motion specific negative peak of motion-onset VEPs was significantly ($p<0.001$) delayed in dyslexics, displaying no difference in its amplitude.
Conclusions Our results confirm a selective magnocellular pathway disorder in dyslexics and indicate that the motion-onset VEPs might serve as an objective method for early diagnosis of dyslexia.