INSIGHT ON ALZHEIMER DISEASE FROM VISUAL SYSTEM ELECTROPHYSIOLOGY.

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Background and Rationale: Visuo-spatial troubles are common in Alzheimer's disease (AD) patients; moreover, the neurosensory retina emerges as a prominent site of AD pathology. In this study, we aimed to evaluate electrophysiologically each visual subsystem involvement in a group of AD patients, using equiluminant Chromatic Pattern Electroretinograms (ChPERGs) and Chromatic Pattern Visual Evoked Potentials (ChVEPs) in attempt to detect specific pathognomonic markers of disease.
Method: Data were obtained from 15 AD pts (9 females and 6 males, mean age $\pm$ 1SD 77.6 ± 4.01 yrs,) not yet undergoing any treatment, and from 10 age- and sex-matched healthy controls (5 females and 5 males, mean age $\pm$ 1SD 71.3 ± 7.2).
ChPERGs were recorded monocularly in response to equiluminant red-green (R-G) and blue-yellow (B-Y) stimuli, known to emphasize the contribution of parvo- (P) and konio- (K)-cellular streams respectively, and achromatic luminance (Lum, magnocellular stream, M) yellow-black (Y-Bk) horizontal square gratings of 0.3 c/deg and 90% contrast (K), reversed at 1Hz, displayed on a TV monitor at a viewing distance of 24 cm (59.2*59 deg field). ChVEPs were recorded to onset (300 ms) and offset (700ms) equiluminant chromatic sinusoidal gratings of different K (90 and 25%). Diagnosis was clinically and neuro-radiologically established, after having excluded other possible causes of dementia.
Results: all data were retrieved in terms of peak-amplitude and latency (for both ChPERGs and ChVEPs) and the obtained values were assessed using the Student's *t-test* for paired data. As expected, temporal features of ChPERGs, as well as ChVEPs, in AD patients differed from those of to luminance Y-Bk grating in AD group ($p<0.01$).
Conclusions: the deficits of the responses arising from the M streams of visual processing pointed out in this study could be related or indicate a primary dysfunction of the M-pathways in Alzheimer's disease. Indeed the M pathway has anatomo-physiological characteristic which make it more suitable for detecting form, motion and depth, compared with P one, functions impaired in AD patients.

References

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