Introduction

Background: Multiple sclerosis (MS) is a disease of the central nervous system in which the interplay between inflammatory and neurodegenerative processes typically results in intermittent neurological disorders followed by progressive accumulation of disability. The first clinical symptoms observed in about 20% of relapsing-remitting and secondary progressive MS patients is optic neuritis (ON). ON is an acute inflammatory disorder that causes demyelination of the optic nerve, thinning of the retinal nerve fiber layer (RNFL), and death of retinal ganglion cells (RGCs). These clinical symptoms can be observed and studied in the experimental autoimmune encephalomyelitis (EAE) model induced through myelin oligodendrocyte glycoprotein (MOG) injection. Immunized C57BL/6 mice develop chronic EAE. For what concerns the visual system, EAE is characterized by optic nerve abnormalities, consisting in demyelination and/or axonal loss, and retina damage detectable with visual evoked potentials (VEPs) and optical coherence tomography (OCT), respectively.

Objective: The present study aims at investigating the usefulness of non-invasive visual evoked potential (VEP) and optical coherence tomography (OCT) to detect optic nerve involvement in the EAE model.

Results

Clinical score, VEP latency and OCT

![Representative VEP traces](image1)

VEP latency

Figure 3. Percentage of N1 latency change in EAE (green line, n=10) and HEALTHY group (black line, n=7) normalized on baseline. The error bars represent the SEM. Statistically significant differences between EAE and HEALTHY group were detected at 11, 15, 19, 31 and 37 dpi.

VEP amplitude

Discussion

- N1 latencies of EAE mice were significantly delayed, compared with the healthy group, before the clinical onset (at 11 and 15 dpi), as well as after the onset (at 19, 31 and 37 dpi). The partial recovery observed at 23 dpi could be due to an increase of the healthy group latency. The amplitude showed a greater variability compared to the latency, but a significant difference between EAE and HEALTHY group could be observed in the chronic phase.
- OCT showed a significant reduction of NGCC thickness in EAE compared to healthy group at 37 dpi. The correlation between latency delay and NGCC thickness was found at 37 dpi (r=-0.661; p=0.007). Green dots represent HEALTHY (7 eyes) and black dots represent EAE (7 eyes).

Literature

5. Increases N1 et al. Microglia Activation of Optic Nerve Pathology with High Sensitive Charge Neutralization Optic Neuritis Tomography. 2006.