

Poster presentation

## Myasthenia gravis: a pupillometric study

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### Background

Myasthenia gravis (MG) is a disease of the neuromuscular junction (NMJ) that, in its typical form, is caused by autoimmune on the postsynaptic receptors of Acetylcholine (AChRs) of the Peripheral Nervous System (PNS)1. We investigate the effect of MG on the Central Nervous System (CNS) and the pupillary smooth muscle.

### Materials and methods

40 Myasthenic patients, recently diagnosed with MG based on their clinical features, electrodiagnostic tests and high titers of anti-AChRs took part in this research and 40 healthy subjects of matching age and gender underwent a pupillometric study in both eyes, first to single flash stimuli of 24.6 candelas/m<sup>2</sup> intensity and 20 msec duration and secondly to multiple repetitive flash stimuli of the same intensity and duration whose frequency was increased every 30 seconds from 0.6 to 1.8 Hz with successive steps of 0.3 Hz.

The pupillometric parameters that were studied are: 1. Initial Radius, 2. Latent Period, 3. Time to Maximum Contraction, 4. Amplitude of the Contraction, 5. Maximum Speed and Maximum Acceleration of the Contraction.

### Results

A statistically significant increase in the Latent Period and a decrease in the Amplitude, the Maximum Speed and Maximum Acceleration to single flash stimuli and a decrease in the Amplitude of the Pupil's Oscillations to multiple repetitive flash stimuli was observed in Myasthenic patients, in contrast to the same parameters in the non-Myasthenic subjects.

### Discussion

It is widely believed that MG is a disease of the PNS and the striated muscles, so that the CNS and the smooth muscles are not affected. On the other hand, many previous studies propose a dysfunction of the AChRs not only in the PNS, but also a disorder of the AChRs that are located in the CNS.

The Myasthenic Pupils are characterized by a "sluggish" reaction, as indicated by the increase in the Latent Period and the decrease in the Amplitude, the Maximum Speed and the Maximum Acceleration to single flash stimuli and the Amplitude of the Pupil's Oscillations to multiple repetitive flash stimuli. These findings may reflect a reduction in the amount of Acetylcholine that is available in the NMJ of the pupil's smooth muscle or a broader Central Cholinergic deficit2. This hypothesis is reinforced by the restoration of the predictable values of the parameters under study after the administration of anti-acetylcholinesterase drugs.

### References

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2. Fotiou F, Fountoulakis KN: **Evidence for a central cholinergic deficit in myasthenia gravis.** *J Neuropsychiatry Clin Neurosci* 2000, **12**:514-515.