Ocular Vestibular Evoked Myogenic Potentials in Myasthenia Gravis

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Introduction
Myasthenia gravis (MG) is a neuromuscular disease characterized by fatigability and fluctuating muscle weakness that predominantly involves ocular muscles. A recent study by Valko et al. has shown the possibility to measure fatigability in the ocular muscles by using ocular vestibular evoked myogenic potentials (oVEMP) in a cohort of 27 MG patients. The aim of the current study is to study the diagnostic value of the oVEMP test for the diagnosis of MG, and to investigate the influence of the use of acetylcholinesterase inhibitors on oVEMP decrement.

Methods
We performed the oVEMP test in 35 AChR MG patients, 11 seronegative MG (SNMG) patients and 11 healthy controls. The oVEMPs were elicited with a handheld mini-shaker giving 4-ms bursts of 500-Hz vibration to the center of the skull, with bone conduction of the vibration resulting in stimulation of both semicircular canals. The oVEMP potentials were recorded by electrodes below the eyes measuring the activity of the inferior oblique muscles. To investigate decrement, we performed repetitive stimulation in trains of 10 stimuli at 20 Hz. We repeated each train 40 times per patient and used the mean of these data. Decrement was calculated by using the oVEMP potential after the second stimulus and dividing this by the mean oVEMP potential of the fifth to ninth stimulus (Valko et al. 2016). Signals were analyzed by a fully automatic program using MatLab avoiding any bias in analyzing the results. We investigated differences in the mean oVEMP decrements by performing unpaired t-tests. A ROC curve was used to determine the optimal cut-off value for diagnostic use of the oVEMP test.

Results
In both AChR MG and SNMG patients, oVEMP decrement was significantly higher than in healthy controls (25.36 ± 5.8; p=0.02, 33.6% ± 6.6; p=0.0002 and -0.39 ± 3.4, respectively). At a cut-off value of 10.4% decrement, the sensitivity and the specificity of the oVEMP test for MG was 80% and 100%, respectively. Ocular MG patients (n=8) tended to have a higher decrement than generalized patients (n=27) (36.0% ± 7.8 and 22.2% ± 7.1, respectively; p=0.33). MG patients that did not use acetylcholinesterase inhibitors in the last 5 hours (n=22) tended to have a higher decrement than MG patients that did use these drugs before oVEMP testing (n=13) (28.4% ± 8.9 and 20.3% ± 4.3, respectively; p=0.51).

Discussion
This study suggests that the oVEMP test could be a sensitive and objective tool in the diagnosis of MG and especially for SNMG and ocular MG patients, groups where other test findings are often negative. In contrast to a neostigmine test or ice test, the fully automated analysis avoided any subjective factors that might influence the interpretation of the results of the oVEMP test. In order to further investigate the diagnostic use of the oVEMP test, the next step is to study the performance of the test in other neuromuscular diseases and patients with non-neuromuscular diseases that can cause diplopia.

Disclosures:

R.H.P. de Meel reports no relevant disclosures.

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