Quantitative Assessment of Fatigue Severity by Means of Manual Infrared Pupillometry in Multiple Sclerosis

Main Author-S. Samadzadeh[1], R. Abolfazli[2], S. Najafinia[3], C. Morcinek[1], P. Rieckmann[4*]

1-Herz-Hirn Zentrum, Akademisches Krankenhaus Sozialstiftung Bamberg, Germany

2-Amiralam Hospital-Tehran University of Medical Sciences, Iran

3-Mechanical Engineering Department, Amirkabir University of Technology, Iran,

4-Specialist Clinic for Neurology, Medical Park LOIPL, Germany

Introduction/Aims:

This study is conducted to evaluate the potential usefulness of pupillometry for assessing magnitude of relative afferent pupillary defects, EDSS, number of previous optic neuritis attacks (PONAs), fatigue severity in RRMS patients.

Methods:

We analyzed Pupillometry data (NeurOptics®NPi-200TM) including neurological pupil index (NPi), pupil size (PS), minimum size of pupil (MinPS), percentage change of pupil size (CH), Constriction Velocity(CV), Maximum of Constriction Velocity (MCV), and Dilation Velocity (DV) from 182 RRMS and 90 healthy controls. To assess the changes across case and control subjects, multiple regression with age and group as independent variable was run. To address the effect of PONAs, an ANCOVA was run. The eye with no PONAs was considered as covariate. To address EDSS and fatigue, we categorized eyes with no PONAs into two category of high and low scores. Age-adjusted control group were compared by ANCOVA.

Results:

In multiple regressions, dichotomous variable of group statistically significantly predicted just PS and MinPS (P<.005) with Adj. R^2=0.17, Adj. R^2=0.19, respectively. In ANCOVA analysis of PONAs, there was statistically significant differences in NPI, PS, MCV, DV and CH between groups. The notable effect size belongs to CH, (p < .0005). Statistical mean variations among control group and either groups of EDSS/MFIS was significant for PS and CH variable.

Conclusions:

Our prospective study provides solid data that pupilometer is an easy to use, new technique to quantify the visual pathway function in MS. The results suggest that MS-related symptoms statistically affect pupillometry results, and thereby offers a new tool for measurements.