Metamorphopsia measurement with AMD - A Metamorphopsia Detector® as a patient reported outcome (PRO) measure

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Purpose
Metamorphopsia as a patient reported outcome can be documented by the computer based interactive program AMD - A Metamorphopsia Detector® (patent pending). This study was performed to compare metamorphopsia measurement by AMD - A Meta-morphopsia Detector® with results of the National Eye Institute Visual Function Questionnaire - 25 (NEI-VFQ 25) reflecting vision related quality of life.

Method
75 patients with unilateral metamorphopsia performed monocular metamorphopsia measurement with AMD - A Metamorphopsia Detector® [1-2]. The software uses the concept of a negative image: a distorted image can be straightened by using the computer mouse. Amplitude (d), localization (I) and area (a) of distorted lines are transformed into single dimensions and summarized in a global value. All patients were asked to fill out the NEI-VFQ 25 [3]; response rate was 56% (n=42, caucasian, age 40-86 years, 19 male, 23 female). In all responding patients (macular edema due to age related macular degeneration=22, central venous thrombosis=2, diabetes=3, uveitis=4, intermediate AMD=7, macular pucker=4) correlation of NEI-VFQ 25 (subscale near vision) on the one side and AMD - A Metamorphopsia Detector® global value (GI) or single dimensions respectively were measured. Prior to the study all patients signed informed consent according to the declaration of Helsinki/Edinburgh.

Results I
I. Metamorphopsia Global Value
Correlation of metamorphopsia global value with subscale near vision of NEI VFQ 25 was strong (Fig.1): Pearson correlation coefficient $\rho = -0.87$ (95% confidence interval: $-0.93$; $-0.77$, $p < 0.001$).

Results II
II. Metamorphopsia Single Dimensions
Correlation of metamorphopsia single dimensions with NEI VFQ 25 subscale near vision was strong for amplitude, localization and area of distortion (Fig. 2a-c).

Results III
III. Best corrected visual acuity
Correlation of metamorphopsia global value (GI) with BCVA of the eye with metamorphopsia (Meta-eye) was just about strong: $\rho = 0.53$ (CI: 0.27; 0.72, $p < 0.001$).

Discussion
Best corrected visual acuity of the eye with metamorphopsia and of partner eye were taken into account as potential confounders. Further confounders might be dominance of eyes and accompanying eye diseases.

Conclusion
As a quantitative test highly correlating with vision related quality of life AMD – A Metamorphopsia Detector® can deliver information about a patient reported outcome [4-5] in macular disease. Whereas the validated questionnaire NEI VFQ 25 delivers data about vision related quality of life referring to binocular vision, measurement with AMD - A Metamorphopsia Detector® provides information about monocular metamorphopsia.

Strongest correlations were found between vision-related quality of life (subscale near vision) and metamorphopsia global index (GI), single dimension amplitude (d), localization (I) and area of distortion (a). Because metamorphopsia has a significant influence on quality of life it should be regarded as a patient relevant outcome.

Literature

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