

ID: 664

TOPIC: Diagnosis - Glaucoma all types

Comparison of VR-Based and Conventional Perimetry in Relation to OCT-Derived Structural Measurements: An Observational Study

Anna Pacwa¹, Zuzanna Przybylska², Bartłomiej Kocurek³, Adrian Smedowski³

¹Department of Clinical Genetics and Rare Diseases, Faculty of Medical Sciences in Katowice, Medical University of Silesia in Katowice, The Laboratory for Translational Research in Ophthalmology, Department of Ophthalmology, Faculty of Medical Sciences in Katowice, Medical University of Silesia in Katowice, GlaucoTech Co., Katowice, Katowice, Poland, ²Department of Clinical Genetics and Rare Diseases, Faculty of Medical Sciences in Katowice, Medical University of Silesia in Katowice, Katowice, Poland, ³Department of Ophthalmology, Kornel Gibinski University Clinical Center, Medical University of Silesia in Katowice, Department of Ophthalmology, Faculty of Medical Sciences in Katowice, Medical University of Silesia in Katowice, GlaucoTech Co., Katowice, Katowice, Poland

Comparison of VR-Based and Conventional Perimetry in Relation to OCT-Derived Structural Measurements: An Observational Study

Purpose:

To evaluate structure–function relationships and compare functional static Humphrey-based visual field parameters obtained using a conventional stationary perimeter (Optopol) and a virtual reality (VR)–based perimeter (MMD) with structural retinal parameters measured by optical coherence tomography (OCT).

Methods:

Fifty-seven patients underwent visual field testing, 24-2, SITA FAST-based protocol, using a stationary perimeter (Optopol) and a VR-based perimeter (MMD), as well as OCT imaging. Functional parameters analyzed included mean deviation (MD), pattern standard deviation (PSD), and visual quality/field index (VQi/VFi). Functional outcomes obtained from the VR-based perimeter were directly compared with those from static perimetry performed on the Optopol device. Structural parameters included ganglion cell complex (GCC) and retinal nerve fiber layer (RNFL) thickness. Correlations between functional and structural parameters were assessed to compare structure–function relationships across both perimetric technologies.

Results:

Patients were divided into two groups, patients with visual fluctuations (with no respect to fixation loss, false positive and false negative errors) and patients with respect to visual fluctuations (fixation loss, false positive and negative below 15%). In the first group, VR perimeter appeared to be non-inferior to the stationary one. The results obtained by patients with high reliability of visual field test correlated better with morphological parameters (RNFL and GCC) in case of VR-perimetry (MD vs RNFL $r=0.4$, $p=0.02$; MD vs GCC $r=0.55$, $p=0.0001$; PSD vs RNFL $r=-0.35$, $p=0.03$; PSD vs GCC $r=-0.6$,

p=0.0001) than stationary perimetry (MD vs RNFL $r=0.3$, $p=0.08$; MD vs GCC $r=0.50$, $p=0.0002$; PSD vs RNFL $r=-0.27$, $p=0.09$; PSD vs GCC $r=-0.5$, $p=0.0003$).

Conclusions:

VR-based perimetry was non-inferior to stationary perimetry in patients with visual field fluctuations. In patients with high test reliability, VR perimetry demonstrated stronger structure-function correlations with OCT-derived RNFL and GCC parameters compared to conventional stationary perimetry. These findings suggest that VR perimetry may provide more robust functional-structural associations under reliable testing conditions, supporting its potential clinical utility in visual field assessment.