Evaluation of a visual field test strategy AIZE-EX.

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(Purpose)

The imo is one of the standard automated perimetries and can test both right and left eyes at once (Matsumoto C, et al. Plos one. 2016). The imo employs the ambient interactive ZEST (AIZE) for visual field (VF) test strategy. Detectability of glaucomatous VF abnormalities with AIZE was comparable to the SITA-standard (Kimura T, et al. Clincal ophthalmology. 2019). AIZE-EX is a new test strategy for follow-up VF testing with glaucoma patients. The aim of this study was to compare VF results between AIZE and AIZE-EX.

(Method)

Forty four eyes of 22 glaucoma patients were enrolled. All patients underwent AIZE 24-2 VF test at baseline visit and both AIZE and AIZE-EX 24-2 VF tests at follow-up visit, all VF tests performed on the imo. Mean deviation (MD) and test time were compared between AIZE and AIZE-EX.

(Result)

AIZE MD at baseline was -4.8±4.6 dB, follow up AIZE and AIZE-EX MDs were -4.5±4.9 dB and -4.4±4.9dB (p=0.942). Test time of AIZE-EX (5min48sec±50sec) was significantly shorter than that of AIZE (8min15sec±50sec) (p<0.001).

(Conclusion)

MD values of AIZE and AIZE-EX were comparable. AIZE-EX saved test time about 30% compared to AIZE. AIZE-EX is useful time saving VF test strategy for monitoring glaucoma patients.

Characteristic findings of functional visual loss with perimeter imo

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Purpose:

Using imo binocular random single eye test, both right and left visual fields are tested at once by showing the target alternately and randomly to each eye. Using this method, a patient cannot recognize which eye is being tested. In this study, we compared the conventional visual field test results with the binocular random single eye test in patients with functional visual loss.

Methods:

The subjects were 23 patients (11-55 years old, mean age 20.9±11.6 years), 12 males and 11 females diagnosed with functional visual loss. All subjects were tested under monocular test using HFA, imo, Goldmann perimeter, and imo binocular random single eye test. To quantify the similarity of the left and right visual field disturbances, left and right visual field values were compared, and the average of the difference was calculated.

Results:

In the monocular test, 18 cases (78%) showed unilateral visual field disturbances, and 5 cases (22%) showed bilateral visual field disturbances. In the binocular random single eye test, the abnormal area decreased in all unilateral cases, and the abnormal area increased on the normal side field in 10 cases. The average of left and right visual field sensitivity differences using the binocular random single eye test (0.94dB) in all unilateral cases was significantly smaller than the monocular test (14.13dB) (p<0.001).

Conclusions:

In patients with functional visual loss, the similarity of left and right visual field patterns increased using the binocular random single eye test. The binocular random single eye test has the potential for new insight into the diagnosis of functional visual loss.

The efficiency of detection of a glaucoma visual field defect using a tablet perimetry tool: the Multi-Stimulus vision tester (MVT-s)

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Purpose: To investigate the characteristics of the Multi-Stimulus vision tester (MVT-s) based on the multi-point stimulation method and their usefulness and reproducibility in detecting glaucomatous visual field (VF) defects.

Subjects: This study enrolled 41 eyes of 41 patients with glaucoma (early: 15 eyes, moderate: 13 eyes, severe: 10 eyes, Average of the mean defect (MD) -9.3 ± 6.0 dB) and 31 eyes of 31 visually normal individuals.

Methods: MVT-s was performed with a tablet at a distance of 25 cm, using a multi-point stimulation method with flickering VF test points, with up to three test points presented simultaneously and the examine responding by directly touching the test points. Test conditions are background luminance: 100 cd/m2, stimulus luminance: 88.6 ~114.4 cd/m2, frequency 15 Hz, stimulus size increased or decreased by 10% to 150% per eccentricity based on Goldmann V. All patients underwent 24plus (1-2) program by imo and MVT-s. In addition, we investigated the sensitivity and reproducibility of detecting VF defect and examination time.

Results: The area under the curve calculated based on the number of abnormal points was 0.97. The sensitivity of MVT-s was 90.2%, and specificity of 96.6% in case three or more abnormal points by the MVT-s testing were defined as abnormal. The coefficient variation of the abnormal points by three times testing was 0.36 in the early stage, 0.24 in the moderate stage, and 0.06 in the severe stage. The mean testing time was 50.1 ± 9.4 seconds in the normal eyes and 191.7 ± 62.4 seconds in the glaucoma eyes.

Conclusion: The MVT-s was a useful tool for detecting VF defects in glaucoma because of their simplicity and short testing time.

New portable binocular perimeter imo vifa

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Purpose

We have developed a new portable binocular perimeter named imo vifa, which provides visual field testing under comfortable binocular conditions with a higher tolerance head position alignment than the original imo perimeter. In this study, we compare the performance of the imo vifa with original imo in normal subjects and glaucoma patients. We also compared the tolerance of the head alignment system between both devices.

Methods

One hundred thirty-six normal subjects and 46 glaucoma patients were tested using AIZE 30-2 and AIZE 10-2 binocular random single eye test using both imo and imo vifa. Furthermore, ten normal subjects were tested under the artificial head miss alignment environment using both devices and we compared the effect for the results.

Results

The average MS value of normal subjects is 0.9dB higher in imo vifa than imo. The MD values of imo vifa were highly correlated with imo in glaucoma patients (y=0.95x-0.13 R^2=0.76). The average test duration of AIZE 30-2 in glaucoma patients was 5:33±1:02 min in imo vifa and 6:06 ±1:02 min in imo. The acceptable artificial head miss-alignment range was within ±2.5mm in imo and ±8.0 mm in imo vifa.

Conclusions

imo vifa showed consistent performance with the original imo for evaluating the glaucomatous visual field disturbances. The tolerance for the head miss-alignment was higher in imo vifa than in the original imo. It will be helpful in clinical usage to reduce the artifact caused by head position miss-alignment during the perimetry.

High density perimetry and foveal avascular zone in glaucoma.

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Purpose: to evaluate the structure and function association between macular high density perimetry (Octopus Macular program) and foveal avascular zone (FAZ), macular vascular density (VD) and ganglion cells layer (GCL) in glaucoma patients.

Methods: 93 eyes from 47 patients were included in this study. Perimetry was performed using Octopus 900 Macular program that includes high-density stimuli: 45 points one degree spacing in the fovea (central 4 degrees) and 36 points radially oriented from 4 to 10 degrees. FAZ, VD and GCL were evaluated using Triton angio-OCT. Vascular parameters were: FAZ area, perimeter and circularity as also macular VD (divided in superior, inferior, nasal, temporal e central). VF variables were MD, MS, sLV and GCL evaluation included total, superior and inferior means. Vascular parameters were considered dependent variables and GCL independent for structure/structure analysis. For structure/function analysis VF indices were the dependent variables and vascular parameters, independent. GEE was used for the analysis as both eyes entered in all models and uni and multivariable analysis were performed. FAZ parameters were automatically calculated using ImageJ software.

Results: 25 women and 22 men were included, the mean age was 66,67 (+/-7,36). Mean of MS was 23,25 (+/-5.53) and mean central GCL was 57,07 microns (+/-7.24). Regarding the VF indices, MD and MS were significant associated with FAZ area, circularity, and perimeter as also superior and inferior macular VD (P<0.05), sLV was not associated with any vascular parameter. For structure/structure analysis, significant associations were found between FAZ area and superior GCL(P<0.05). FAZ perimeter, FAZ Circularity and superior VD were significantly associated with all GCL parameters (P<0.05). When multivariable analysis was performed for VF indices (MS and MD), only perimetry and temporal vascular density was significant associated (P<0.05).

Conclusion: When using high density perimetry, VF indices were associated with FAZ alterations in glaucoma patient. Additionally, structural macular losses were associated with vascular changes. This region of interest approach could be used in clinical practice for better structure and function evaluation considering vascular abnormalities in glaucoma.