Patterns of Central 10-2 Visual Field Changes in Patients with Primary Open Angle Glaucoma in South West Nigeria

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Introduction: In glaucoma there is progressive death of the retinal ganglion cells and axons. The highest density of retinal ganglion cells (RGC) lies at the macula[1] and damage to the macula has now been shown to occur early in glaucoma.[2] On standard automated perimetry, the macula is represented within 10 degrees of fixation. The traditional 24-2 visual field (VF) strategy tests only 4 points in this region, while the 10-2 strategy tests 68 points. The 24-2 test has previously missed VF defects that were detected using 10-2 test.[3] Quality of vision, and invariably quality of life for glaucoma patients can be adversely affected if macula damage is overlooked because functionally, the macula is key to daily tasks like reading, driving, and contrast sensitivity. The aim of this study is to determine patterns of VF defects of this vulnerable macula using the 10-2 VF strategy in Africans with early to moderate primary open angle glaucoma.

Methods: The clinical study was conducted over a period of 18 months. Glaucomatous eyes of consenting patients which met inclusion criteria were studied. Comprehensive ophthalmic assessment including Optical Coherence Tomography (OCT) evaluation was done. The Humphrey Field Analyzer II was used for both 24-2 and 10-2 test strategies. The second or third perimetric readings were used for the analysis to reduce learning effect. This was performed within one month of initial test. The same trained operator carried out the perimetry tests. The pattern deviation plots of only reliable VF print out was evaluated for the VF patterns.

Results: A total of 504 eyes, 282(56%) eyes with early POAG and 222(44%) with moderate POAG were included in final analysis. Only reliable 10-2 VF print outs were analyzed. The different patterns of 10-2 VF seen were grouped as previously described by Traynis *et al*.[4] Figure 1 shows the patterns and their percentages seen among the study respondents. Fifteen eyes (3%) did not have any defects on their 10-2 VF, but further evaluation of their corresponding 24-2 VF revealed defects that were more peripheral, outside the central 10°.

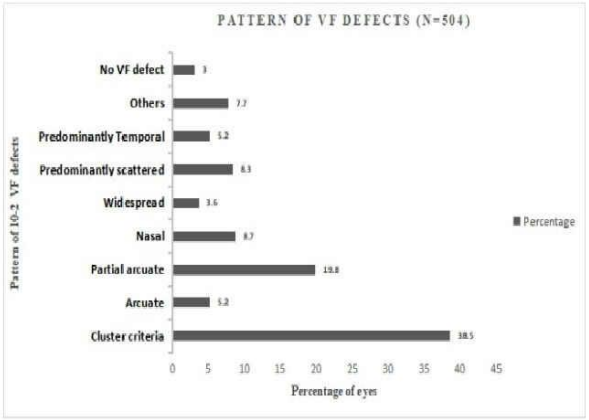

Figure 1: Patterns of visual field defects on 10-2 VF test of POAG patients aged 40 years and above with early to moderate disease.

Discussion: The predominant patterns were cluster points close to fixation and partial arcuate patterns. These defects were more superior and closer to fixation, an area which corresponds to the inferotemporal macula area, the Macula Vulnerability Zone,[5] an area most susceptible to early damage in glaucoma. Such defects that are closer to fixation are known to increase patient's risk of developing field loss earlier and faster,[6] thus such eyes may benefit from more aggressive treatment. Our study also highlighted the need to examine 24-2 test for peripheral defects when the 10-2 test shows no defect. As limitation, we used Swedish Interactive Threshold Algorithm (SITA) fast in order to improve patient cooperation. However, SITA Fast underestimates scotoma or defect detection. Therefore, one can infer that perhaps even more 10-2 VF scotomas or VF defects are more likely present using SITA standard. This further buttresses the presence of VF defects on 10-2 tests. A recent study using trend based

analyses reported 10-2 test detects progression earlier than 24-2 test in eyes with early field defects.[7] Therefore, in low resource settings, the use of serial 10-2 perimetric tests to monitor early glaucoma progression should be further investigated, as this could be relatively cheaper than serial OCT tests.

Conclusion: Perimetry remains an integral tool for glaucoma diagnosis and monitoring despite recent advances in technology. The ability of the 10-2 test strategy to identify VF defects in early POAG confers additional benefit on the use of the comparatively low cost SAP machine in disease evaluation especially in areas with limited resources. We recommend prospective studies to investigate the benefit of using serial 10-2 tests to monitor glaucoma progression. This can be done by monitoring the actual numeric change in decibel (dB) value of each point in every 10-2 test quadrants of patients with early glaucoma.

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