Editorial

Choosing the Correct Visual Field Test for Routine Glaucoma Diagnosis and Management

Rashid Zia

DOI 10.36351/pjo.v35i4.988 *Pak J Ophthalmol 2019, Vol. 35, No. 4*

Glaucoma, is a group of conditions characterized by optic disc cupping and visual field defects. Evaluation, staging and monitoring of glaucoma requires a series of functional tests which is a time consuming process. So far, Standard Automated Perimetry (SAP) is recognized as a reference standard for all the functional testing[1]. Glaucoma may present with a structural or a functional change. Therefore, the correct test strategy for diagnosis is vital to prevent overlooking the onset of glaucoma[2].

Assessment of functional loss in glaucoma is traditionally done by static automated perimeter, most commonly Humphrey visual field analyzer. Routinely 24-2 or 30-2 SITA patterns are widely employed strategies. There is a positive predictive value of each location in 24-2 test pattern for the detection of glaucomatous visual field loss. According to Wang et al 95% of visual field defects could be identified with only 30 of the 52 test locations. They determined that only 43 test locations were required to detect all visual field defects in the database[3].

The National Institute of Health and Care Excellence (NICE) guidelines were updated in November 2017 to better achieve appropriate diagnosis and management of primary open angle glaucoma (POAG) patients[4]. The NICE guidelines, recommend central visual field assessment using standard automated perimetry (full threshold or supra-threshold) as a major criteria in both the diagnosis and the monitoring of primary open angle glaucoma[4]. However, recent evidence provides various challenges to the above mentioned algorithms.

Thirty percentage of the ganglion cells of the entire retina, corresponding to over 60% of the visual cortex are expressed in the central 10-degrees of the visual field[5]. Changes or the visual field defects in the central 10 degrees are not fully assessed in the 24-2 test because the total number of points tested within the central 9 degrees is only 4 plus the foveal sensitivity. In contrast, the 10-2 visual field test has 68 test points each separated by only 2 degrees in the central 10 degrees of visual field. Thus, it is more reliable to detect the presence and progression of the paracentral visual field defects.

Recommendations by the World Glaucoma Association Consensus series are: (a) "Threshold algorithms are preferred over supra threshold for glaucoma diagnosis. Suprathreshold algorithms can be helpful in cases of unreliable results from threshold algorithms[6]. And (b) "using the 10-2 strategy in addition to the conventional 24-2 Humphrey grid can improve the detection of central functional loss"[7].

It is important to detect and monitor central and paracentral visual field loss because early, even initial macular field loss occurs in some patients[7]. Studies have shown that 16% of the normal 24-2 hemifield tests were actually abnormal when tested with 10-2 algorithm[8]. Having said that the 10-2 algorithm is not able to detect the more peripheral field defects. However, it was also shown that by adding 4 points from the 10-2 test pattern to the 24-2 test pattern resulted in better detection of macular defects[9]. Chen et al showed that if two points were added to the superior macular region of the Humphrey 24-2 pattern, it increased the number of abnormal locations

in individuals with glaucoma[10]. Thus, clinicians should be aware of the limitations of the 24-2 in the presence of suspicious discs and 'normal' visual fields[11].

Carl Ziess has developed a 24-2 test augmented with additional points from 10-2 as suggested by Ehrilch et al[12] called SITA faster 24-2C. This software upgrade is available for only new Humphery machines i.e. HFA[3]. The SITA Faster 24-2C test pattern showed an enhanced sensitivity to detect visual field loss in the central 10 degrees over the SITA Fast 24-2 pattern. The increased total and pattern deviation flagging of the 10 additional SITA Faster 24-2C points corresponded to the flagging of the same points tested on the SITA Fast 10-2 test. The SITA Faster 24-2C test may offer earlier detection of central visual field loss without the need to run a supplementary 10-2 test for some patients. Similar facility is also available in G programme by Octopus perimeter (Haag Striet, GmBh).

REFERENCES

1. Diagnosis of Primary open angle glaucoma; the 10th Consensus Report of the World Glaucoma Association; vison function: consensus statements 1 pp 21; 2016 ©Kugler Publications.
2. Diagnosis of Primary open angle glaucoma; the 10th Consensus Report of the World Glaucoma Association; vison function: consensus statements 9 pp 22; 2016 ©Kugler Publications.
3. **Wang Y, Henson DB.** Diagnostic performance visual field test using subsets of 24-2 test pattern for early glaucomatous field loss. Invst Ophthalmol Vis Sci. 2013; 54 (1): 756-761.
4. National Institute for Health and Care Excellence. Diagnosis and management of chronic open angle glaucoma and ocular hypertension. National Institute for Health and Care Excellence, 2017:
5. **Schira MM, Wade AR, Tyler CW.** Two dimential mapping of the central and parafoveal visual field to human cortex. J Neurophysiol. 2007; 97 (6); 4282-4295.
6. **Traynis I, De Moraes CG Raza AS, Liebmann JM, Ritch R, Hood DC.** Prevalence and nature of early glaucomatous defects in the central 10 degrees of visual field JAMA Ophthalmol. 2014; 132 (3): 291-297.
7. **Rao HL, Begum VU, Khada D, Mandal AK, Senthil S, Garudadri SH.** Comparing glaucoma progression on 24-2 and 10-2 visual field examination PLos One, 2015; 10 (5); e0127233.
8. **Chen S, McKendrick AM, Turpin A.** Choosing two points to add to the 24-2 pattern to better describe macular visual field damage due to glaucoma. The British journal of ophthalmology, 2015; 99 (9): 1236-9.
9. **Heijl A, Lundqvist L.** The frequency distribution of earliest glaucomatous visual field defects documented by automatic perimetry. Acta Ophthalmol (Copenh). 1984; 62 (4): 658-64.
10. **Traynis I, De Moraes CG, Raza AS, Liebmann JM, Ritch R, Hood DC.** Prevalence and nature of early glaucomatous defects in the central 10 degrees of the visual field. JAMA Ophthalmol. 2014; 132 (3): 291-7.
11. **Hood DC, Moraes CG.** Four Questions for Every Clinician Diagnosing and Monitoring Glaucoma. J Glaucoma, 2018 Jun 18.
12. **Ehrlich AC, Raza AS, Ritch R, Hood DC.** Modifying the Conventional Visual Field Test Pattern to Improve the Detection of Early Glaucomatous Defects in the Central 10 degrees. Translational Vision Science & Technology, 2014; 3 (6): 6.

Author's Affiliation

Dr. Rashid Zia
Lead Ophthalmologist
New Hayesbank Ophthalmology Services;
Ashford Kent, UK
Email: rashidzia@nhs.net