

The efficient use of perimetry for neuro-ophthalmic diagnosis

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Abstract

Aims/background—Automated perimetry is both one of the most important diagnostic procedures in ophthalmology and the most difficult for the patient who is required to comply with strict and tiring conditions. This paper examines the use of a moving fixation target and a strategy for full threshold determination only in those data points found to be abnormal.

Methods—142 eyes in 71 patients were subjected to two types of visual field tests: the Dicon TKS 4000 Autoperimeter program 5 and the Humphrey field analyser program 30/2. The first procedure was compared with a commonly used instrument and strategy that is usually employed for the management of glaucoma patients.

Results—Such a strategy was used in patients presenting with neuro-ophthalmic problems taking an average testing time of 14.9 minutes. The alternative test described here took an average of 3.9 minutes, without loss of diagnostic value.

Conclusion—The shorter testing time results in greater patient acceptance, fewer fatigue induced artefacts, and the possibility of completing a perimetry test with patients whose ability might seriously be challenged by a longer test. The reduced time required and the more natural condition of not having to fixate on an unmoving position were found not to reduce the diagnostic value of the data produced in patients presenting for various reasons at a neuro-ophthalmology clinic.

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The visual field screening of patients presenting at a busy neuro-ophthalmic department has different requirements from perimetry carried out for the purpose of glaucoma follow up; nevertheless, the same strategies are often used. In the management of patients with glaucoma the primary requirement is to be able to find and assess small progressions in a known field defect, eye by eye, with individuals who become experienced with perimetry techniques.

In the diagnosis of neurological diseases, perimetry is required to find and define unknown defects in the visual field of both eyes at the same session. Moreover, these patients are more likely to have attention problems and find perimetry a new difficult experience.

However, there is also the possibility that such patients also suffer from undiagnosed glaucoma.

In the neurological screening situation time is of the essence in two ways: firstly, there is no opportunity to perform four or five repeat tests in order to train¹ the patient to be accurate as is needed in glaucoma management perimetry; secondly, the character of the patient population dictates that the test must be as quick and as stress free as possible.

This paper describes the results obtained from fields performed on 142 eyes in 71 perimetrically naive patients, comparing a conventional full threshold strategy, as commonly used both in glaucoma management and for all other perimetry purposes, with one that was thought to be less stressful. Both testing methods cover the central field and the peripheral field to 30 degree eccentricity.

Patients and methods

PATIENTS

A total of 142 eyes in 71 patients (females 47, males 24, average age 41.8 (SD14.9) years) were subjected to two types of visual field tests; the order in which each type of test was performed was randomised. The distribution of presenting reasons showed the typical variance of a neuro-ophthalmic outpatient department. Most of the patients participating in this study were referred because of intracerebral tumour, papillary symptoms, macular symptoms, headache of unknown origin, or transient visual loss (Table 1).

INSTRUMENTS AND STRATEGIES USED

The standard reference test was carried out with a Humphrey autoperimeter using program 30/2. This thresholds 76 points in a square grid pattern within 30 degrees of eccentricity. The fixation point is unmoving, the background illumination is set at 10 cd/m², stimulus duration is 200 ms, and interstimulus interval 200-400 ms. The tests under investigation were carried out using a Dicon TKS

Table 1 Distribution (%) of reasons for referral

Tumour	15
Cerebral vascular accident	3.3
Papillary symptoms	21.6
Macular symptoms	8.3
Headache of unknown origin	8.3
Optic neuritis	3.3
Transient visual loss	20
Aneurysm	1.6
Epilepsy	1.6
Siccadian syndrome	1.6
Keratoconus	1.6
Normal patients	13.3

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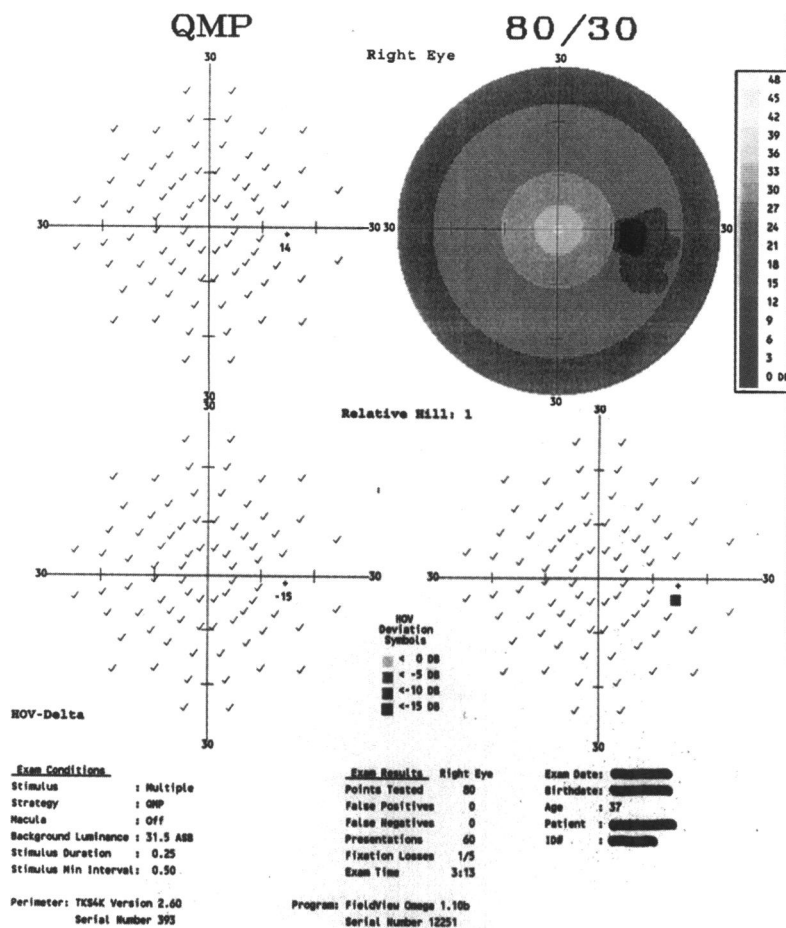


Figure 2 Typical artefact in Dicon program 5 perimetry.

occasional missed point next to the blind spot is not normally regarded as a pathological abnormality. Allowing for this, the defects found by the Dicon perimeter but not by the reference procedure on the Humphrey perimeter are: one case of temporal constriction, one of unspecific relative scotoma, one of arcuate scotoma, and three small central scotomata. It is interesting that a procedure thought to be advantageous for screening neurological patients seems to be successful in finding small scotomata of a type more associated with glaucoma; perhaps because of the use of a radial pattern rather than a square grid that makes the mathematics of programming for grey scale displays simpler.

The artefacts on first testing found on the Humphrey perimeter, which can be attributed to fatigue causing drooping eyelids or attention contraction, were found in 57 eyes or 40% of the total, which is not surprising considering the increase in testing time.

The differences in false positive responses (positive or negative) reflect the differences in testing conditions and the different criteria used in each strategy. In the case of the Dicon perimeter the stimulus to respond after each movement of the fixation target is countered by target movements finishing without a stimulus followed by astonishment if the patient gives false response. Other authors⁵ have not found this to be a problem. Moreover, in comparing the number of false positives recorded by the two systems throughout the test (not just those that occur in response to a specific trial as in the Humphrey perimeter) the major difference was lack of false negatives with the Dicon perimeter, which can be attributed to the shorter testing time, or the more attention holding moving fixation target, or to a combination of both of these.⁶

Conclusion

After the elimination of known artefacts caused by fatigue in long periods of perimetry or by the test pattern density near the blind spot, there was little difference in the clinical usefulness of the compared strategies.

However, the striking difference was the reduced testing time with the Dicon program 5 by a factor of 3.8; this is only 26% of the time necessary for the Humphrey perimeter program 30/2. This shorter testing time can result in less patient stress, less patient aversion to repeat perimetry, fewer fatigue induced artefacts, and higher patient throughput in a given time.

- 1 Wood JM, Wild JM, Hussey MK. Serial examination of the normal visual field using Octopus automated projection perimetry. Evidence for a learning effect. *Acta Ophthalmol* 1987;65:326-33.
- 2 Jacobs NA, Patterson IH. Variability of the hill of vision and its significance in automated perimetry. *Br J Ophthalmol* 1985;69:824-6.
- 3 Henson DB, Anderson R. Thresholds using single and multiple stimulus presentations. *Perimetry Update* 1988/89; 191-6.
- 4 Yi Li, Mills RP. Kinetic fixation improves threshold sensitivity in the central visual field. *J Glaucoma* 1992;1:108-16.
- 5 Chauhan BC, McCormick TA, Whelan JH, Mohandas RN. Variability of normal visual fields in a prospective study. *Perimetry Update* 1994/95;27-30.
- 6 Demirel S, Vingrys AJ. Acceptable false response rates for reliable perimetric outcomes. *Perimetry Update* 1994/95; 83-8.

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