

# BRITISH JOURNAL OF OPHTHALMOLOGY

---

## Editorials

---

### Computerised perimetry – the emperor's new clothes?

The paper evaluating the Humphrey FASTPAC threshold program in glaucoma by O'Brien *et al*, in this issue, shows that a complex test program yields more information than the simpler FASTPAC program. This is perhaps not surprising since their subjects were already known to be successful in performing the complex test. The selection bias rather begs a question: how many unselected elderly glaucoma patients might fail to complete the longer test yet give a satisfactory result with the shorter FASTPAC? Why have the manufacturers now simplified an expensive and sophisticated piece of equipment like the Humphrey field analyser with FASTPAC software? They may have realised the true value of simple and practical tests and abandoned the pursuit of spurious accuracy. Scientists in all disciplines know the limitations of making a test too sensitive if it does not help the true signal (in this case pathological change in visual field) stand out from the background noise (patients' learning curve, short term and long term fluctuation, etc). Like the subjects of Hans Andersen's fairy tale emperor,<sup>1</sup> we may have been acclaiming a non-existent suit of new clothes.

In principle, computerised visual field tests, as originally envisaged, reduce many practical difficulties<sup>2</sup>: less skilled personnel are required to administer the test; a subject's loss of fixation is readily monitored and automatically recorded; complex mathematical analysis derives numerical indices such as mean deviation, pattern standard deviation, and corrected pattern standard deviation which help distinguish overall loss of sensitivity from localised defects (this conveniently overlooks the fact that just such overall reduction in sensitivity occurs in glaucoma and that localised scotomas occur in many conditions other than glaucoma, including cortical cataract); results can be stored in the computer for comparison with future tests. Indeed this comparison is so complex that it requires statistical software – for example, STATPAC. These indices may still be no more reliable in detecting change than clinical inspection of results from conventional manual perimeters.<sup>3</sup> Perhaps the greatest success of computerised tests has been to make ophthalmologists more aware of the importance of regular, accurate visual field assessment in glaucoma patients.

The more recent introduction of the shorter test programs such as FASTPAC may be an admission of the diminishing returns from increasing the complexity of field tests. Complexity may not improve the signal to noise ratio but the 'noise' of short term and long term fluctuation is better understood. It is now recognised that the longer tests require a longer learning curve on the patient's part. The simple Friedmann analyser is less prone to this source of error than the computerised Humphrey analyser.<sup>4</sup>

The limits of patient cooperation have been relearned. Tests developed on young, alert, volunteer subjects do not always translate to subjects who are elderly or fearful or who have disabilities which can affect concentration and comprehension. The difficulty in maintaining the subject's concentration is increased in patients with advanced loss of visual field because the program spends much unproductive time exploring blind areas. Also, the matrix of central stimuli is not dense enough to give as much information as manual, kinetic testing. Even now this may be the better way of measuring change in a tiny residual island of central field, especially of 5° or less. Indeed the patient's own report of subjective change in this stage of the disease is often ahead of measurable deterioration and should not be disregarded.

The failure of computerised visual field tests to provide sufficient information to support a major advance in glaucoma management is shown, not only in the belated trend to simplify the test programs, but also in the increased interest in imaging the structure of the optic nerve head. Much research effort has switched from visual field study to direct measurement of the area of neural tissue visible at the optic disc. Simple ophthalmoscopic examination for optic disc cupping developed into stereophotographic analysis and, finally, measurement of neuroretinal rim area using various methods.<sup>5-9</sup> To date, the limited agreement of results from these different techniques suggests there will be no easy solution. An example of the difficulty is the necessity to draw a line around the cup to demarcate the edge of the neuroretinal rim to be measured. This is seldom a sharp and easily defined border.

We have learned that it is not necessary to make an immediate diagnosis of glaucoma in a suspicious or equivocal case. Rather than attempt to do so by using tonography, diurnal pressure curve measurement, or water drinking and other provocative tests, we are often content to wait and simply repeat the measurement of pressure over weeks or months. The same philosophy applies to visual field tests. It is inappropriate to force an equivocal test result into artificial categories of normal or abnormal. Making the test more complex does not help. Even combinations of techniques such as light sense, flicker, and resolution perimetry only increase the sensitivity of the test at the expense of specificity.<sup>10</sup> The appearance of clinically detectable visual field defects is, after all, an arbitrary and variable point on the progression of nerve fibre damage which seems to occur when substantial numbers of fibres have been lost.<sup>11</sup> We should be less interested in this arbitrary point at which field defects appear than in detecting progressive damage to vision which requires intervention. Indeed, this is the purpose of STATPAC

and similar software but a long sequence of consecutive tests is required.<sup>12</sup>

It might therefore be more effective if a less sensitive test was used in the first place. With the appearance of FASTPAC and other simple test programs it seems that computerised field analysis is approaching the performance of machines such as the venerable Friedmann visual field analyser. Is the emperor's new suit being replaced by something more appropriate for everyday use? Having been to the limits of complex physiological measurement of visual field, it is timely to establish the minimum test strategy to enable us to make practical management decisions. We should develop a pragmatic view of testing the visual field.

J L JAY

Tennent Institute of Ophthalmology,  
Western Infirmary,  
Glasgow G11 6NT

- 1 *The emperor's new clothes. Hans Andersen's Fairy Tales.* London: Hodder and Stoughton, 1923: 403–66.
- 2 Cyrilin MM. Automated perimetry. In: Ritch R, Shields MB, Krupin T, eds. *The glaucomas.* St Louis: Mosby, 1989: 403–66.

- 3 Chauhan BC, Drance SM, Douglas GR. The use of visual field indices in detecting changes in the visual field in glaucoma. *Invest Ophthalmol Vis Sci* 1990; 31: 512–20.
- 4 Hitchings RA, Migdal CS, Wormald R, Poinoswamy D, Fitzke F. The primary treatment trial: changes in the visual field analysis by computer-assisted perimetry. *Eye* 1994; 8: 117–20.
- 5 Littmann H. Zur Bestimmung der Wahren Grösse eines Objektes auf dem Hintergrund des lebender Auges. *Klin Monatsbl Augenheilkd* 1982; 180: 286–9.
- 6 Balazsi AG, Drance SM, Schulzer M. Neuroretinal rim area in suspected glaucoma and early chronic open angle glaucoma: correlation with parameters of visual function. *Arch Ophthalmol* 1984; 102: 1011–4.
- 7 Caprioli J, Klingbeil U, Sears M, Pope B. Reproducibility of optic disc measurement with computerised analysis of stereo video images. *Arch Ophthalmol* 1986; 104: 1035–9.
- 8 Nasemann JE, Burk ROW, eds. *Scanning laser ophthalmoscopy.* Munich: Quintessenz, 1990.
- 9 Montgomery DMI. Measurement of optic disc and neuroretinal rim areas in normal and glaucomatous eyes. A new clinical method. *Ophthalmology* 1991; 98: 50–9.
- 10 Lachenmayr BJ, Drance SM, Douglas GR, Mikelberg FS. Light-sense, flicker and resolution perimetry in glaucoma: a comparative study. *Graefes Arch Clin Exp Ophthalmol* 1991; 29: 246–51.
- 11 Quigley HA, Addicks EM, Green WR. Optic nerve damage in human glaucoma, III: quantitative correlation of nerve fibres and visual field defect in glaucoma, ischaemic neuropathy, papilloedema and toxic neuropathy. *Arch Ophthalmol* 1982; 100: 135–46.
- 12 Werner EB, Bishop KI, Koelle J, Douglas GR, Le Blanc RP, Mills RP, et al. A comparison of experienced clinical observers and statistical tests in detection of progressive visual field loss in glaucoma using automated perimetry. *Arch Ophthalmol* 1988; 106: 619–23.

## Conjunctival melanoma

Conjunctival melanoma (CM) is a rare unilateral disease of the middle aged and elderly. It is those centres where these cases are collected which have developed and reported current management strategies.<sup>1–6</sup> For example, in this issue of the journal Paridaens *et al* report on 95 cases from 1948 to 1991 where orbital exenteration was undertaken for CM, and conclude that this drastic operation often fails to cure. As a professional community however, we have yet to pool the resources at our disposal to understand the nature of the condition. Until we do it will be difficult to assess whether there has been any change in the behaviour of CM.

While some ophthalmologists will never see a new case in their careers, most of us are confronted from time to time by lesions which might be CM. At this early point we should seek to avoid the pitfalls of generating needless anxiety while ensuring appropriate intervention and referral when necessary. This has become easier since the concept of primary acquired melanosis (PAM) has become widely accepted and has done much to clarify diagnostic and management strategy.<sup>3,7,8</sup> Accordingly we have derived diagnostic algorithms for 'in-house' use which are published on page 592, which some readers may find useful.

Meanwhile the sevenfold increase in the prevalence of cutaneous melanoma is properly matched by the number of publications describing this cancer in Australia, Europe, and the USA in the past 20 years.<sup>9–11</sup> The incontrovertible epidemiological evidence for this increase has stimulated examination of possible aetiological factors ranging from a change in global irradiation, through social habits, to factors at the genetic and molecular level. It is worth asking if there are any parallels between pigmented tumours of the skin and the conjunctiva. Important questions, some prompted by recent publications, include:

- (a) Is there a change in prevalence of PAM and/or CM in those countries where cutaneous melanoma is increasing?
- (b) Do any of the risk factors applicable to cutaneous melanoma apply to CM – for example, pale skin, freckles, number of moles, sunburn?

(c) Does the wearing of spectacles confer any protection against the development of CM and PAM?

(d) Are there genetic susceptibilities to tumours of the skin and eye, other than those which appear to exist for xeroderma pigmentosa<sup>12</sup> and dysplastic naevus syndrome?<sup>13</sup>

(e) Is CM amenable to classification with regard to prognosis according to proliferative indices, chromosomal anomalies, oestrogen sensitivity?<sup>14–17</sup>

Attempts to answer these and other questions will be greatly facilitated by comprehensive reporting of PAM and CM. Cancer registries exist for other conditions – for example, leukaemia, and attract good returns of data from enthusiasts. OPCS statistics currently do have an entry for ocular tumours. However, the entry is not subdivided into the different tumours of the eye, there is no entry for tumour related deaths, and there is likely to be considerable under-reporting.

Should the reporting of all ocular tumours, including CM, be made automatic by ocular pathologists, or should we support and join the development of a clinical oncology information network?<sup>18</sup> Both could be developed through the offices of the Royal College of Ophthalmologists. Any such step would be complementary and contributory to the Ocular Oncology Group of the European Organisation for Research and Treatment of Cancer. (B Damato, 1994 personal communication) It should not be beyond us to develop the infrastructure for collating comprehensive data on ocular tumours. Jakobiec wrote of CM in 1980 as 'unfinished business',<sup>19</sup> and years later this is still an apt description of this frightening lesion, whose only concession so far is its rarity.

A B TULLO  
R BONSHK

Manchester Royal Eye Hospital,  
Oxford Road,  
Manchester M13 9WH

- 1 De Potter P, Shields CL, Shields JA, Menduke H. Clinical predictive factors for development of recurrence and metastasis in conjunctival melanoma: a review of 68 cases. *Br J Ophthalmol* 1993; 77: 624–30.