Predicting acuities in patients with cataracts

Sir, Recently I have read with such interest an article published in a major refereed ophthalmological scientific journal. The article by Halliday and Ross1 is of interest.

I completely agree with their statement that any surgeon relying on interferometers to predict postoperative acuities in cataract patients might seriously misjudge the visual potential of many patients. In the May issue of the American Journal of Ophthalmology I outlined how the surgeon must combine all of his clinical acumen and other testing knowledge to fully utilise the results of interferometer tests.2

I agree with the authors that the results with the retinometer and the visometer are identical. For this reason I refer to both of them as interferometer testing.3

The patients studied were 50 whose eyes were operated on for cataracts, some of which had extracapsular procedures. Halliday and Ross were particularly concerned about the 8 patients whose interference visual acuity was better than their final postoperative Snellen chart visual acuity. One of their patients had cystoid macular oedema, 2 had diabetic retinopathy, 2 had senile macular degeneration, and 3 had 'normal eyes which may be assumed to have some degree of amblyopia.'

These patients had diagnoses that fell into the group of clinical conditions that I point out should be recognised preoperatively and give 'false positive' readings with the interferometers. This being the case, these patients should have been recognised preoperatively. Therefore the interference visual acuity is meaningless in predicting postoperative Snellen visual acuity. Did the 2 patients with diabetic retinopathy have cystoid macular oedema? Did the patients with senile macular degeneration have serous fluid under the sensory epithelium of the macula or geographic atrophy of the pigment epithelium of the macula? Did the 'three normal eyes' indeed have amblyopia, or could they have been in the group of patients with extracapsular procedures who may have had some clouding of the posterior capsule? We were not given these pertinent pieces of data. I and others have demonstrated that cystoid macular oedema, serous fluid under the sensory epithelium of the macula, geographic atrophy of the pigment epithelium, amblyopia, and clouding of the posterior capsule after extracapsular surgery cause a disparity between the interference visual acuity and Snellen visual acuity.4,5

The authors reported on 8 patients with mature cataracts who failed to see the interference patterns. This has been well documented in the literature, and these patients should have been recognised and not included in the series.6 The authors reported on 20 patients (presumably 20 eyes) seeing better than predicted.

The authors stated that testing took 15 to 20 minutes per patient. We are dealing with an elderly population of patients; and in our hundreds of tested patients, always including testing with the potential acuity meter, Rodenstock laser interferometer, and visometer, the average time of testing with all of these per patient for both eyes is less than 5 minutes. Perhaps in the group of patients reported in this article there was some difficulty in testing the 20 who eventually saw better than had been predicted. Eyes tested with the oblique pattern see less well than those with horizontal or vertical.4 The authors do not mention how often the oblique pattern was the final end point.

In the '22 control eyes with no media opacities' Halliday and Ross reported 3 eyes recording a much better interference visual acuity than Snellen visual acuity. The same 3 patients had a disparity when tested with the visometer. Further on in the paper 1 found that 2 of these were amblyopic and one had macular degeneration. As has been stated before, amblyopia always gives a disparity with the interferometers and Snellen visual acuity, and the type of macular degeneration was not specified. If the macular degeneration was that with fluid under the retina or geographic atrophy of the pigment epithelium of the macula, then a disparity between interference visual acuity and Snellen visual acuity would be expected, as has been documented.

Perhaps the authors do not appreciate how the Haag-Streit visometer actually works. In this instrument the light is passed through double diffraction gratings (moire fringes device) to produce a coherent light which in turn is doubled, and these double beams of coherent light are used to produce an interference fringe within the retina much like the Rodenstock laser interferometer uses a double beam of coherent light to produce an interference fringe. The authors refer to a single beam coming from the visometer when actually 2 beams enter the patient's pupil. It is instructive to sit in front of the instrument and have someone focus both beams from the visometer into the pupil of one's own eye. Then one will observe interference fringes produced within the retina. Now, if one occludes one beam carefully with a smooth-edged opaque piece of paper, one still sees bands of light; but this is the moire fringe diffraction grating and not the interference pattern that is produced only when 2 coherent beams are used.

It was also stated that 2 brightness settings were available with the Haag-Streit visometer. Actually 2 size settings 0-15 mm and 0-5 mm, are available, not related to brightness. The 0-5 mm setting is only useful in orienting oneself in the patient's pupil and then the 0-15 should always be used. Any brightness change has to come from rheostats set in the controls of the Haag-Streit slit-lamp.

Be that as it may, contrary to what the authors stated, the retinometer and visometer are extremely useful in predicting postoperative Snellen visual acuities in cataract patients, provided we exclude those clinical situations that we now know cause false positive readings. These clinical conditions are: (1) cystoid macular oedema, (2) serous detachment of the sensory epithelium of the macula, (3) visual fields cut through fixation, (4) amblyopia, (5) macular holes or cysts, (6) geographic atrophy of the pigment epithelium of the macula, and (7) early postoperative retinal detachment.

Again, let me agree with the last sentence of the article, 'Any surgeon relying on these tests alone would seriously misjudge the visual potential of many patients.' We as surgeons must use and integrate all information and knowledge available to us and then evaluate any given test.
Correspondence / Book review

with a particular instrument to make that particular test worthwhile.
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References

3. Faulkner HW. Predicting acuities in capsulotomy patients (interferometers and potential acuity meter) Am Intraoc Implant Soc in press.

Sir, Thank you for this opportunity to reply to Dr Faulkner. We maintain that laser interferometry has little practical use and disagree with his comment above that these instruments are ‘extremely useful.’ Paradoxically his own paper supports our view.

He reports that of 137 eyes tested 98 were correctly predicted to within 2 lines on the Snellen chart. This leaves (39 (28%) incorrectly predicted. We would conclude from this that the test is inaccurate. However, Faulkner argues that careful preoperative assessment, including formal field testing and fluorescein angiography on every patient, can identify 7 groups of patients in whom interferometer testing is likely to be inaccurate. He excludes these groups and is left with apparently normal eyes and those with ‘dry’ senile macular degeneration in whom interferometer testing, he concludes, is accurate and useful.

We have 2 main objections to this. Firstly, the essence of interferometry was that it held out hope of assessing macular function in patients with known or suspected disease. It can hardly be considered a useful test if most of these patients have to be excluded. Secondly, it is scientifically unsound retrospectively to analyse results, choose 2 groups of patients in whom the test appeared to work, and reject 7 groups solely because they do not fit expected results. He is unable to find a common link in the 7 groups other than failure of interferometry. Each group is in any case two small to be analysed separately.

We also suspect that Faulkner’s division between ‘dry’ senile macular degeneration (successfully predicted) and ‘wet’ senile macular degeneration (consistently gave false positive results) is fortuitous and reflects this small group size. A recent report found that in both ‘dry’ and ‘wet’ senile macular degeneration interferometric acuity was a poor guide to Snellen acuity.

May we also point out some factual inaccuracies in Faulkner’s reply. The visometer does have 2 brightness settings completely separate from the 2 size settings. At no point in our paper do we refer to a single beam coming from the visometer. We agree that oblique patterns are seen less well, and we particularly mentioned that oblique settings were excluded in the protocol of our prospective study. Interestingly Faulkner reports that he did use oblique patterns in his experiment. The staircase technique of endpoint adjustment is a much more reliable determination than the method of adjustment used by Faulkner; this no doubt explains how in any patient he tested both eyes on 3 instruments in under 5 minutes.

Patients with suspected eye disease who need a preoperative test of macular function are precisely those in whom interferometric testing is unreliable.

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References


Book review


It is always refreshing to come across an ophthalmic textbook that indulges in lateral thinking, especially when one of the editors is a revered 'old master' of ophthalmology. The 94th volume in the popular series 'Bucherei des Augenarztes' takes as its theme the postoperative management of normal and complicated ocular surgery, dealing with such subjects as late complications and the indications and timing of reoperation.

The 15 surgical articles are varied, covering most procedures, and there are 2 chapters recommending the value of photography in follow-up. It is hard to single out any particular contribution, as the editors have kept the standard high. The illustrations are excellent, and each chapter is provided with a helpful and at times amusing English summary. The idea is a good one and is presented in a brisk and readable form with many points being brought out that would otherwise be glossed over in a more formal type of textbook. The book is designed as much for the ophthalmologist responsible for the aftercare of the patient as for the one undertaking the surgery, and with this intention it succeeds admirably.

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Predicting acuities in patients with cataracts.

H W Faulkner

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