Sir,

How reliable are slit lamp biomicroscopy measurements of anterior segment structures?

Ophthalmologists use the standard slit lamp graticule scale to measure ocular structures in everyday clinical practice. The measurement of posterior pole structures has been particularly well documented.[1,2] Specialist interest has focused on modifying the slit lamp for anterior segment measurements.[3–6] All these techniques are either available only in specialist centres or require modifications to the standard slit lamp biomicroscope. The unmodified slit lamp scale is used in clinical practice to measure ocular surface lesions, such as corneal ulcers and melts, Mooren's ulcers, filtration surgery bleb size, and response to treatment often by different individuals. A recent study on pterygium management showed that one of the most important factors for evaluating severity was its size.[7] The aim of the present study was to test the reliability of methods of ocular surface measurement, as there is no standardised published technique.

Methods and results

A model eye (Altomed, Tyne & Wear, UK) was marked using rectangles cut from paper to mimic ocular surface lesions (Fig. 1). One of these lesions was on the flat surface (F), whilst lesions C1 and C2 were on the curved surface of the model eye. C1 was on the central portion of the radius of curvature, whilst C2 was non-central and termed 'limbal'. The marked eye was mounted onto a standard slit lamp biomicroscope (Haag Streit 900, Berne, Switzerland).

Measurements were taken by ophthalmologists of all grades in our department on two separate occasions 1 week apart on the same slit lamp. They did so by focusing the slit lamp beam onto the centre of the lesion and adjusting the height of the beam. Their measurements were recorded by an observer, but kept masked from the ophthalmologists to avoid bias. Lesions F and C1 had to be measured with the slit lamp beam and objectives aligned axially. For C2, the lesion peripheral to C1, measurements could be taken by varying the angle of the beam, mimicking how these clinicians would normally measure such corneal limbal lesions. The angle of the beam was recorded.

Table 1 shows the measurements taken by 16 clinicians, with repeat measurements by 13. The mean slit lamp measurement (± 95% CI) for F was 4.1 ± 0.1 mm on the first occasion and 4.0 ± 0.2 mm on the second. For C1 the measurements were 6.6 ± 0.1 mm and 6.5 ± 0.1 mm. The non-central lesion C2 was

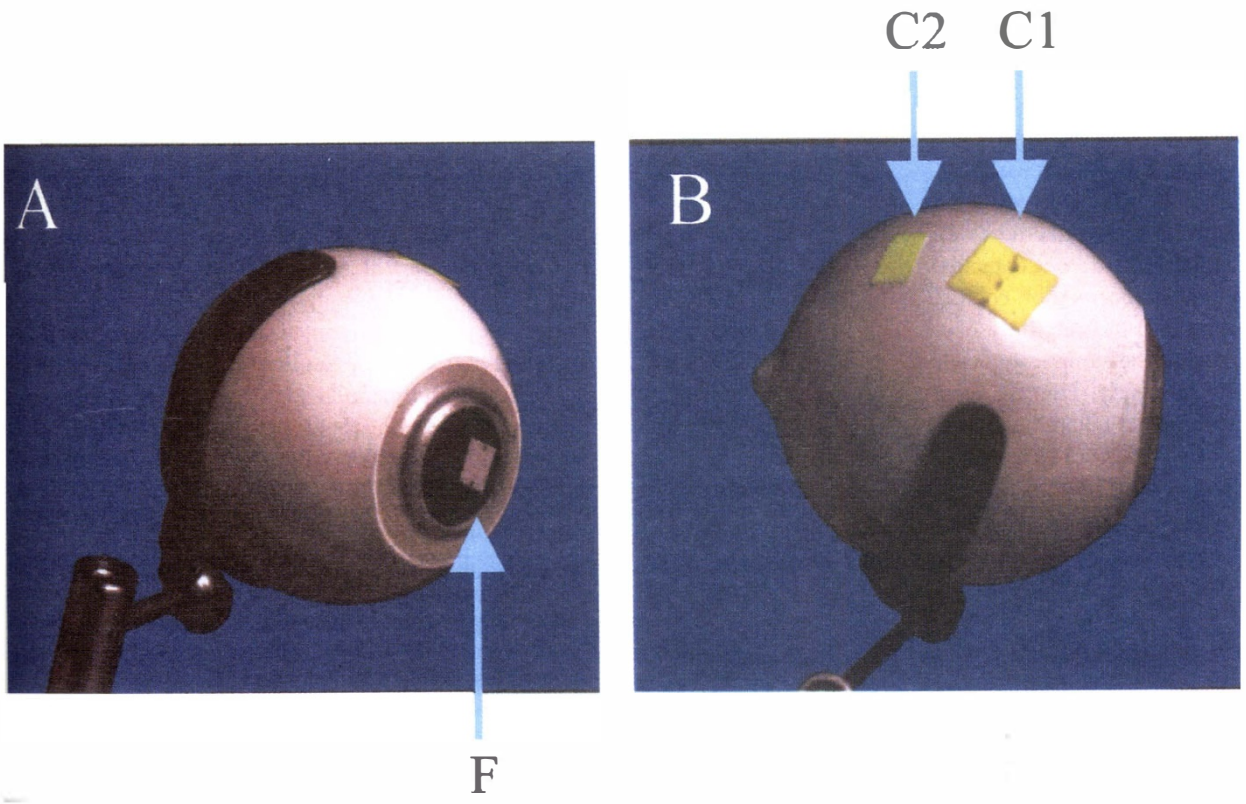

Fig. 1. *The model eye. (A) A central lesion on the flat surface (lesion F). (B) Lesions on the curved surface, one of which is central (lesion C1), the other limbal (lesion C2).*

Table 1. *Measurements of ocular surface lesions. Three lesions (F, flat surface, central; C1, curved surface, central; C2, curved surface, limbal) were measured by 16 ophthalmologists. For C2 the angle of the slit lamp beam could be changed*

	First measurements				Second measurements			
Operator	Lesion F height (mm)	Lesion C1 height (mm)	Lesion C2 height (mm)	Lesion C2 angle of beam (deg)	Lesion F height (mm)	Lesion C1 height (mm)	Lesion C2 height (mm)	Lesion C2 angle of beam (deg)
1	4.30	6.80	5.90	30.00	3.70	6.60	5.80	35.00
2	4.30	6.40	5.95	0.00	4.00	6.70	6.10	0.00
3	4.25	6.70	6.00	0.00	4.15	6.60	5.70	45.00
4	3.75	6.80	5.60	30.00	3.80	6.70	5.70	55.00
5	4.20	6.80	8.00	0.00	4.00	6.70	5.95	0.00
6	3.95	6.80	5.60	0.00	4.10	6.40	5.65	10.00
7	3.75	6.80	5.90	0.00	4.40	6.50	5.80	32.00
8	4.00	6.10	5.80	20.00	3.60	6.30	6.90	25.00
9	4.10	6.80	5.70	30.00	4.10	6.70	5.80	40.00
10	4.30	6.70	6.10	20.00	3.40	6.20	5.20	45.00
11	4.30	6.70	5.90	30.00	4.40	6.80	5.80	50.00
12	4.00	6.20	5.50	35.00	4.10	6.60	5.85	15.00
13	4.20	6.50	5.75	65.00	4.00	6.15	5.15	50.00
14	4.35	–	–	–	–	–	–	–
15	4.30	6.55	6.10	45.00	–	–	–	–
16	4.25	6.55	5.85	0.00	–	–	–	–

measured at beam angles ranging from 0° to 65°. The mean height was 6.0 ± 0.3 mm and 5.8 ± 0.3 mm. The confidence interval is larger for the latter sets of measurements, indicating a greater variability in this measuring technique ($p < 0.05$, Student's t-test). To compare the variability between the first and second set of measurements the standard error of the mean of the differences was calculated at 0.11, 0.08 and 0.21 for F, C1 and C2 respectively. The paired t-test showed that there was no significant difference between the mean measurements for each lesion from week 1 to week 2 ($0.5 > p > 0.01$).

The 'true' height of each of the lesions was measured using digital Vernier callipers. This measurement was taken whilst the paper rectangles were on the model eye, to avoid the need for correction for its radius of curvature, The values were 4.00, 6.75 and 6.20 mm for F, C1 and C2. It is noteworthy that for one set of measurements for C2, the slit lamp mean (± 95% CI) and the true height do not coincide.

Interclass correlation coefficients (ICC) were computed to indicate intra-observer variability on measuring the same lesion twice, a high ICC indicating strong reliability. The ICC was 0.22 and 0.23 for both measurements taken axially (F and C1), but the limbal lesion had a ICC of 0.04. Hence a greater amount of variability occurs within one person's measurements when the beam angle is altered.

Comment

The results from this study show that measurements of ocular surface lesions by different observers using a standard slit lamp are reproducible. The mean measurements were reliable both as a group and from one occasion to the next. However, an individual's measurements are less reliable when the beam angle is altered than when it is set to 0°, on a flat or curved surface. It may be argued that the curved limbal lesion was more difficult to mesaure giving a lower ICC. However, the model eye, unlike the human eye, has a constant radius of curvature, so that the only variable in measuring C2 in the centre of the field of view was the non-axial beam.

Though standardised methods for posterior segment measurements have been described,[1,2] there have been no previous reports of evaluation of techniques for the anterior segment. The results of this study show that all ocular surface lesions should be measured with the beam and objectives aligned axially. This is important as pathological lesions encountered in the eye do not often have such clear margins as the lesions on the model eye. Future developments may well see the widespread use of serial digital photography. Where such technology is not available, the technique of axial slit lamp measurement is the most reliable.

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Sir,

Fine needle aspiration biopsy: an investigative tool for iris metastasis

A case report of a metastatic small cell carcinoma of the lung to the iris diagnosed by fine needle aspiration cytology is presented.

Case report

A 75-year-old woman, a known case of bilateral age-related macular degeneration, was referred to our clinic with a lesion on her right iris. She had previously received chemotherapy for small cell carcinoma of the lung. On examination the visual acuity was 6/9 in the right and counting fingers close to the face in the left eye. There was a raised amelanotic lesion at 3 o'clock on the pupillary border in the right eye (Fig. 1a). There was no ectropion uvea or any localised lens opacities. Fundus examination revealed multiple drusen in the right eye. The left eye had a disciform scar. Intraocular pressures were normal in both eyes. To determine the nature of the iris lesion, iris fluorescein angiography was performed which showed initial hypofluorescence followed by late hyperfluorescence (Fig. 1b, c). Ultrasound biomicroscopy showed a well-defined nodular lesion arising from the iris stroma (Fig. 1d). A diagnosis of an amelanotic iris melanoma/iris metastasis was made. In order to confirm the diagnosis a fine needle aspiration biopsy was performed which was consistent with small cell carcinoma of the lung. The patient was subsequently referred to the oncologist for further management. She died 2 months later.

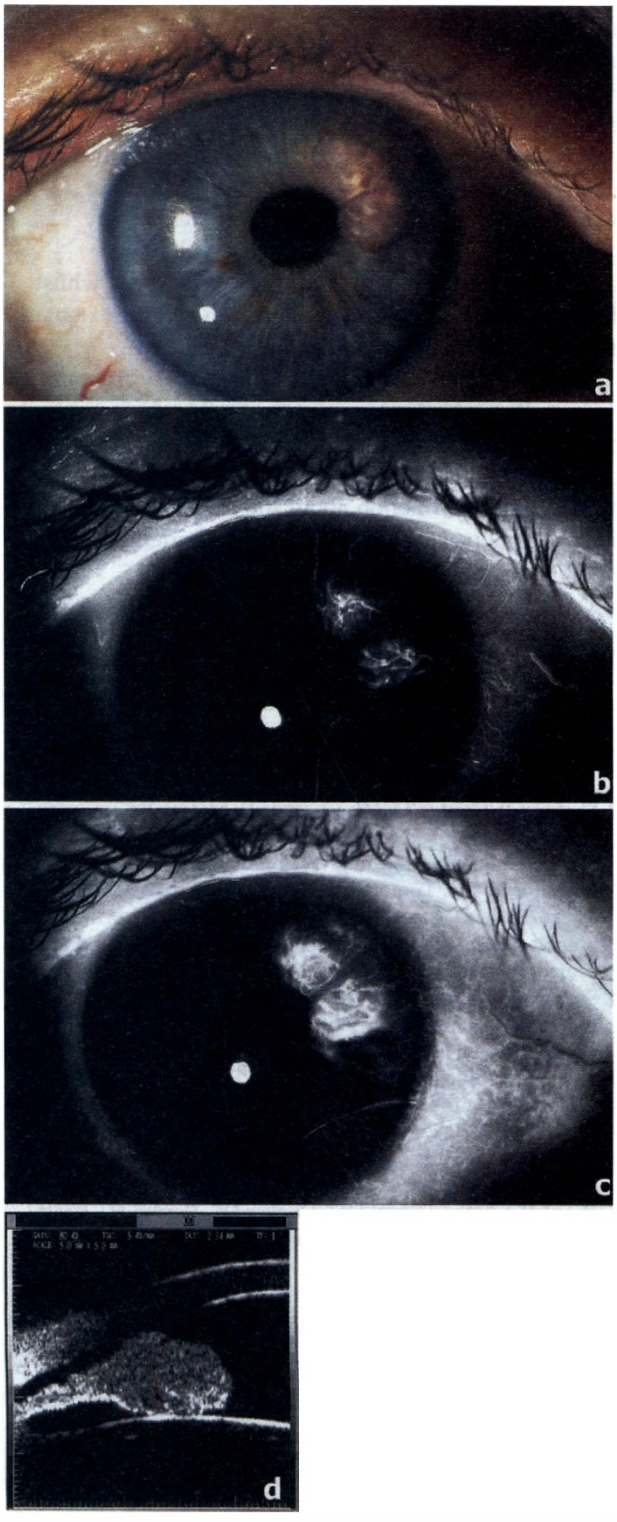

Fig. 1. *(a) Anterior segment photograph showing the lesion. (b) Anterior segment fluorescein angiogram showing early hyperfluorescence. (c) Anterior segment fluorescein angiogram showing late hyperfluorescence. (d) Ultrasound biomicroscopy showing the extent of the lesion.*

Comment

Ocular metastases are the most common intraocular tumour, with the uveal tract being the most common site of metastasis.[1–3] Microscopic intraocular lesions have been found in 5–10% of all patients dying of cancer.[1] Iris metastasis, a rare presentation of disseminated malignant disease,[4,5] commonly presents as a solid amelanotic mass in the inferior quadrant.[6] Iritis,[7] localised lens opacities, spontaneous hyphaema and glaucoma are the other presentations, making iris metastasis difficult to