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Sir,

Reply to 'Evaluation of the effect of JPEG and JPEG2000 image compression on the detection of diabetic retinopathy'

The authors found good agreement for diabetic retinopathy (DR) detection between grading uncompressed tagged interchanged files format (TIFF) images taken with a nonmydriatic digital camera and their joint photographic experts group (JPEG) equivalents, compressed by JPEG2000 or classic JPEG algorithms. Both performed well for the detection of haemorrhages and microaneurysms (HMA), when preselected 'good quality' TIFF images were compressed at the lowest ratio. Our experience in the Gloucestershire Diabetic Eye Screening Service, using a Topcon TRNW5s camera and Sony DXC-950 tri-CCD colour video camera, producing TIFF images of identical resolution (800×600 pixels) is that it ***cannot reliably detect small DR lesions like HMA in the first place.***

The TIFF images of 99 eyes with microaneurysms within one disc diameter of the centre of the fovea (mas $\leqslant$ 1DD), identified by an experienced ophthalmologist (PS) using slit-lamp bio-microscopy, and their fellow 69 eyes with no DR were randomly presented to two experienced and masked independent medical retina specialists (EJ and VG) for grading among other images from 472 eyes with a variety of retinopathy levels. In Table 1, the grading of these TIFF images is compared with the clinical grading as reference. Only 6.1 and 5.1% of mas $\leqslant$ 1DD were detected by VG and EJ respectively. Even allowing for the misclassification of a microaneurysm as a haemorrhage, the detection rates remained poor. Nevertheless, the system did perform well for the detection of referable DR as reported in the Gloucestershire study.[1]

In 2003, a Four Nations Working Group from England, Scotland, Wales, and Northern Ireland[2] recommended a minimum camera resolution of 20 pixels per degree of retinal image (equivalent to 1365×1000) for UK screening programmes. The same year, a Health Technology Assessment by Sharp *et al*[3] reported that the sensitivity and specificity of digital imaging for the detection of early retinopathy were only 81% using a Topcon TRC-50XT with Kodak Megaplus 1.41 CCD camera (1024×1024 pixels in monochrome) compared to slit-lamp bio-microscopy by ophthalmologists. Since then, more high-resolution cameras and camera backs are available to screening programmes resulting in large uncompressed image file sizes.

Studies to determine the maximum acceptable level of image compression have either scanned in high-quality images from film[4] or used images of lower resolution such as Conrath's study. Based on current evidence, the English National Screening Committee recommends the highest quality JPEG compression setting on the digital camera back is used at capture (for example 12 : 1 rather than 20 : 1).[2] Subsequent compressions are more likely to result in the loss of clinically significant information.

Further research is required to determine appropriate levels of compression using higher resolution cameras for both referable retinopathy and any retinopathy.

Table 1 Detection of micro-aneurysms or haemorrhages $\leqslant$1DD from the fovea in TIFF images compared with clinical grading as reference

	Sensitivity		*Specificity*	
	No. (%)	*CI*	*No. (%)*	*CI*
(i) Detection of micro-aneurysms alone $\leqslant$1DD from fovea				
VG	6/99 (6.1%)	2.6–12.9	68/69 (98.6%)	91.5–100
EJ	5/99 (5.1%)	1.9–11.6	67/69 (97.1%)	89.4–99.8
(ii) Detection of micro-aneurysms or haemorrhages $\leqslant$1DD from fovea				
VG	20/99 (20.2%)	13.4–29.2	66/69 (95.7%)	87.5–99.0
EJ	9/99 (9.1%)	4.7–16.6	67/69 (97.1%)	89.4–99.8

CI = 95% confidence intervals.

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D Atan[1], C Foy[2] and PH Scanlon[3]

[1]Academic Department of Ophthalmology, Bristol Eye Hospital, Lower Maudlin St, Bristol, UK
[2]Gloucestershire Eye Unit, Cheltenham General Hospital, Sandford Road, Cheltenham, UK
[3]Gloucestershire Eye Unit, Cheltenham General Hospital, Sandford Road, Cheltenham, UK
E-mail: Denize.Atan@bristol.ac.uk

This work was presented at the Oxford Ophthalmological Congress in 2002 for which Denize Atan was awarded the Founders Cup.

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Sir,

Retinal pigment epithelial rip associated with idiopathic central serous chorioretinopathy

Retinal pigment epithelial (RPE) rips have been reported in association with age-related macular degeneration and laser photocoagulation. Rarely, they occur in central serous chorioretinopathy (CSCR), particularly when the neurosensory detachment is associated with an underlying large pigment epithelial detachment (PED). We documented with fundus imaging, a patient with idiopathic CSCR who developed an RPE rip.

Case report

A 62-year-old man presented with blurring of vision associated with micropsia and metamorphopsia in his left eye for two weeks. Best-corrected visual acuity was 6/12. There was a large neurosensory elevation over the left posterior pole (Figure 1a). Optical coherence tomography (OCT) imaging showed a large PED under the neurosensory detachment (Figure 1b). Four months later, his vision spontaneously recovered to 6/6. There was now a large RPE rip through the inferior half of the macula, sparing the fovea (Figure 2a). Fluorescein angiography demonstrated a well-demarcated crescenteric area of hyperfluorescence corresponding to the RPE rip, surrounded by a rim of hypofluorescence caused by the retracted RPE (Figure 2b). There was a smoke-stack leak in a residual superior blister of neurosensory elevation. The rest of the macula had flattened clinically and on OCT imaging.

Comment

RPE rips have been postulated to develop secondary to a build-up of hydrostatic pressure within a PED, with the weakening of intercellular connections between RPE cells. The break usually occurs at the margin of the detachment, presumably the area of greatest strain.[1,2] Expanding PEDs may eventually exert sufficient tangential stress to result in a rip.[3]

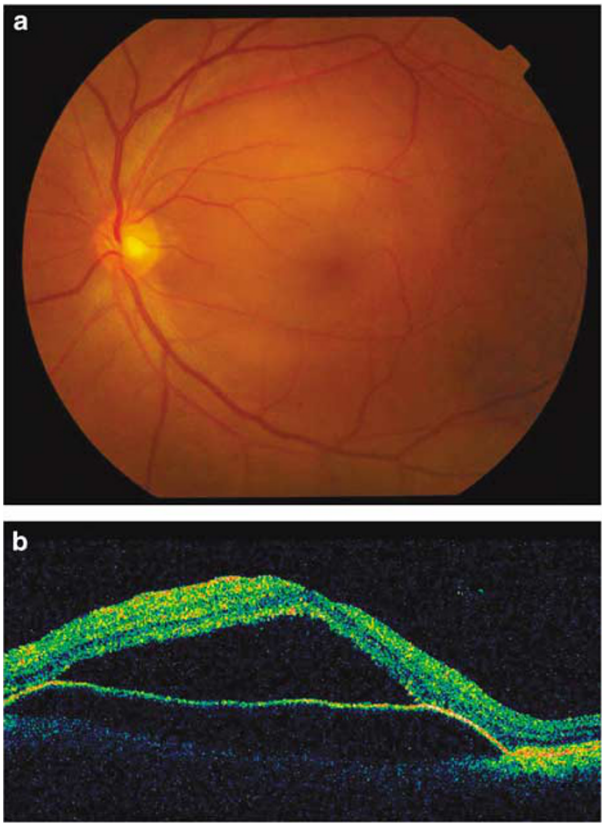

Figure 1 (a) Large left central serous chorioretinopathy of approximately five disc diameters. (b) Optical coherence tomography showing neurosensory detachment with underlying retinal pigment epithelial detachment.

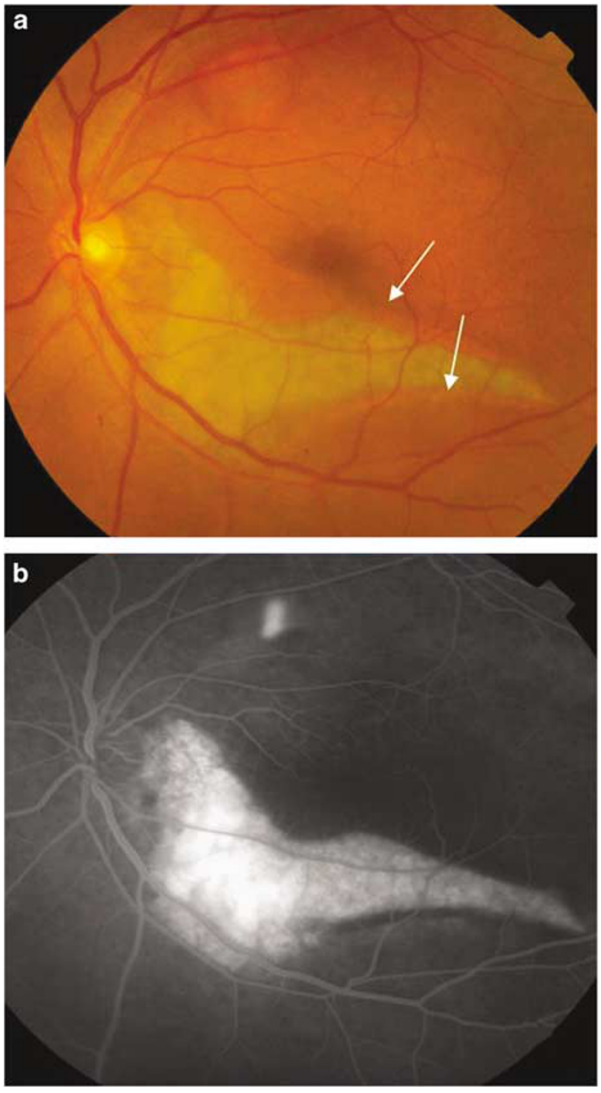

Figure 2 (a) Fundus photograph of the retinal pigment epithelial (RPE) rip surrounded by retracted RPE (white arrows). (b) Fluorescein angiography showing hyperfluorescence in the area of the rip and blocked fluorescence in the area of scrolled RPE.

Reports of RPE defects in association with CSCR are rare.[4,5] In CSCR, focal hyperpermeability of the choriocapillaris overwhelms the RPE initially, leading to serous RPE and neurosensory detachments. The sub-RPE fluid causes tangential stress, leading to formation of a tear. One report described a male patient with CSCR who developed a retinal pigment epithelial tear after inappropriate treatment with oral and subconjunctival steroids.[4] Another report documented two men with severe CSCR, one of whom was on systemic steroids, with RPE 'blow-outs' occurring at the dome of the detachment.[5] Steroid usage is an exacerbating factor. Our patient developed a spontaneous RPE rip with CSCR with no history of steroid use.

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Z Lim and D Wong
Vitreo-Retina Service,
Singapore National Eye Centre, Singapore
E-mail: doric.wong.w.k@snec.com.sg

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Sir,

Responding letter

We thank Drs Atan, Foy and Scanlon for their interest in our study. Our work was retrospectively done on digital image bank photographs for which we wish to define the effect of compression on detection and not the effect of initial image size on detection. In spite of this our conclusion still shows first, that 1.26 MB to 118 KB compression (1:11) remains adequate (which is in accord with the English National Screening Committee's recommendation upon compression ratios), and second that larger image sizes than those we used must be tested clinically. We also think that 'bigger is better' concerning retinal images.

J Conrath and P Massin

Department of Ophthalmology, Hôpital Lariboisière, 2 rue Ambroise Paré, Paris, France
E-mail: John.Conrath@ap-hm.fr

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Sir,

Capsular folds should be documented in setting of small capsulorhexis

We read with interest the recent case report of Late-onset capsular block syndrome without lens displacement.[1] We note that the authors state the operation was uneventful with continuous curvilinear capsulorhexis of moderate size. However, they acknowledge that late structural changes in the anterior capsule with rigid fibrosis had prevented IOL displacement and subsequent myopic shift in their case. It is our understanding that small capsulorhexis is a major risk factor for capsular block syndrome in the setting of retained viscosurgical devices based on fluid analysis.[2]

Our experience in a teaching hospital environment suggests that trainee ophthalmologists start operating by creating relatively small capsulorhexis. This is probably due to a lack of confidence and fear of running out into the zonules. Anatomical apposition of the intraocular implant to the iris in this setting can act as a mechanical block to aqueous outflow, leading to capsular distension syndrome.[3]

Comment

We wish to draw attention to the presence of posterior capsule folds following removal of viscoelastic after intraocular lens implantation in cataract surgery. These two stress lines are folds in the posterior capsule that are closely adherent to the back of the intraocular lens and span the equator between the locations of the two haptics. They can be made to rotate as the intraocular lens changes position during aspiration of viscoelastic. They are often visible at post-operative review. While some reports have queried their relevance, we suggest that their presence implies that the viscoelastic has been adequately removed following lens implantation.[4,5] This positive sign should act as a training point for the trainee ophthalmologist and should be actively acknowledged. This should aid in preventing iatrogenic causes of capsular distension syndrome.

It is our belief that surgical notes should state positive presence of posterior capsule folds following removal of viscosurgical devices in the setting of small capsulorhexis.

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D Lockington and D Mansfield

Department of Ophthalmology, Inverclyde Royal Hospital, Greenock, Scotland, UK
E-mail: davidlockington@hotmail.com

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