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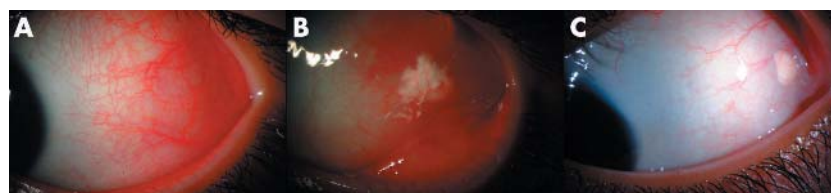
## LETTERS

### Subconjunctival corticosteroid injection for the treatment of non-necrotising anterior scleritis

Scleritis commonly is a recurrent disease that requires long term immunosuppressive treatment that can be associated with significant adverse effects.<sup>1</sup> Although topical and periorbital steroids are accepted therapeutic options for treatment of scleritis, subconjunctival administration of depot corticosteroids has been considered unsafe owing to the risk of scleral thinning and perforation.<sup>2-4</sup> Recently, this has been challenged by reports describing the safe and effective use of subconjunctival depot steroid injections in patients with non-necrotising scleritis.<sup>5-7</sup> Based on these reports we reviewed our experience using subconjunctival corticosteroid injections (SCI) in the management of non-infectious, non-necrotising anterior scleritis.

#### Case reports

A retrospective, non-comparative review of the clinical records of patients with scleritis evaluated at the National Eye Institute was performed and four patients treated with SCI were identified. Subconjunctival triamcinolone acetonide (Kenalog 40 mg/ml, Westwood Squibb Pharmaceuticals, Buffalo, NY, USA) (2-12 mg per injection) was given to an area of active scleritis through a 30 gauge needle following topical anaesthesia in one quadrant of the eye at one time. The initial indication for SCI in all cases was unilaterally active non-necrotising scleritis with adverse effects from systemic immunosuppressive therapy in patients with no known history of ocular hypertension associated with steroids and no underlying disease requiring additional systemic immunosuppressive therapy. Patients were evaluated within 1-2 weeks



**Figure 1** Active diffuse anterior scleritis in the temporal quadrant of the left eye (patient 4, left eye directed nasally) (A), immediately after SCI (B), and 3 months following the SCI (C) is illustrated.

after injection and, 2-4 weeks thereafter. Mean follow up time was 15.75 (SD 7.5) months (range 5-22 months).

In all cases the scleral inflammation was controlled within 2-9 days of SCI without a concurrent increase in systemic immunosuppression. Although effective, each patient subsequently required additional injections because of recurrent disease activity in the treated or the fellow eye within an average time of 7.4 months. However, with one exception, all recurrences developed in a previously untreated quadrant of the eye. Only one patient showed a recurrence of active scleritis in a previously treated quadrant 21 months following the initial SCI. The maximum number of injections given in one eye was four. Following the initiation of the SCI each patient's prednisone dose was tapered by >50% over an average of 5 months. Complications included subconjunctival haemorrhage and transient elevations in IOP that was managed with topical antiglaucoma medications and systemic acetazolamide (table 1). No patient showed enhanced scleral thinning or progression to necrotising scleritis.

#### Comment

Approximately 37% of patients with scleritis have associated systemic diseases.<sup>8</sup> A seminal review of scleritis cases showed that 26.1% of patients with scleritis require systemic

immunosuppressive therapy and, of these, 37.5% experience a treatment complication.<sup>1</sup>

Although associated with cataract and increased intraocular pressure, local steroid therapy offers the benefit of anti-inflammatory control without the side effects of systemic immunosuppressive drugs. However, because of the potential risk of scleral thinning and perforation subconjunctival steroid injections have been avoided for the treatment of scleritis.

Recently, two retrospective studies demonstrated rapid clinical improvement with SCI with no evidence of scleral thinning or serious side effects in non-necrotising scleritis during follow up extending to 23 years.<sup>6,7</sup> However, recurrences occurred in both studies requiring repeated injections. In a prospective study, patients with recalcitrant scleritis were able to discontinue all immunosuppressive therapy after treatment with SCI.<sup>5</sup>

Although SCIs were effective in rapidly controlling the active scleritis in our series, two patients developed steroid response and all developed recurrent scleritis requiring repeated injections. The major benefit of the SCI in this series was that they facilitated >50% reduction in each patient's prednisone dose which could not be achieved or sustained before their use.

This study confirms the existing literature that SCI may be an effective adjunct for the treatment of active non-necrotising anterior

**Table 1** Clinical characteristics, treatment regimens, and adverse events with subconjunctival steroid injection

Patient age, sex	Scleritis type	Associated disease	Systemic treatment before SCI	Side effects from systemic treatment	Prednisone dose followed by relapse before SCI	Duration of scleritis before SCI (months)	Systemic treatment after SCI (last follow up)	Follow up (months)	Side effects from SCI
1, 57, F	Nodular anterior both eyes	Mixed connective tissue disease (inactive)	Pred 15 mg MTX 12.5 mg	Osteoporosis Weight gain	7.5 mg	63	None	22	None
2, 41, M	Diffuse anterior both eyes	None*	Pred 9 mg MMF 2 g	Pneumonia	9 mg	14	Pred 4 mg MMF 2 g	19	Transient IOP increase LE
3, 56, F	Diffuse anterior both eyes	Sjogren's syndrome (inactive)	Pred 20 mg MTX 20 mg	Weight gain Myopathy Recurrent UTI GERD	15 mg	36	Pred 5 mg MTX 25 mg	17	None
4, 11, M	Diffuse anterior both eyes+ Posterior left eye	None	Pred 50 mg CsA 150 mg	Weight gain Persistent headache	50 mg	11	Pred 10 mg	5	Subconjunctival haemorrhage, Transient IOP increase LE

SCI, subconjunctival injection of triamcinolone acetonide; CsA, cyclosporine; MMF, mycophenolate mofetil; Pred, prednisone; UTI, urinary tract infection; GERD, gastroesophageal reflux disease.

Doses in the table indicate daily oral dose for Prednisone and CsA and weekly dose for methotrexate.

\*The patient was HLAB27 positive but did not have any associated systemic manifestations.

scleritis in appropriately selected patients and that this therapy is not unequivocally associated with the risk of scleral thinning or perforation. Local treatment with steroid injections may help reduce potential side effects from systemic therapy in patients with active scleritis in the absence of active systemic disease. As with all retrospective small case series our results should be interpreted with caution.

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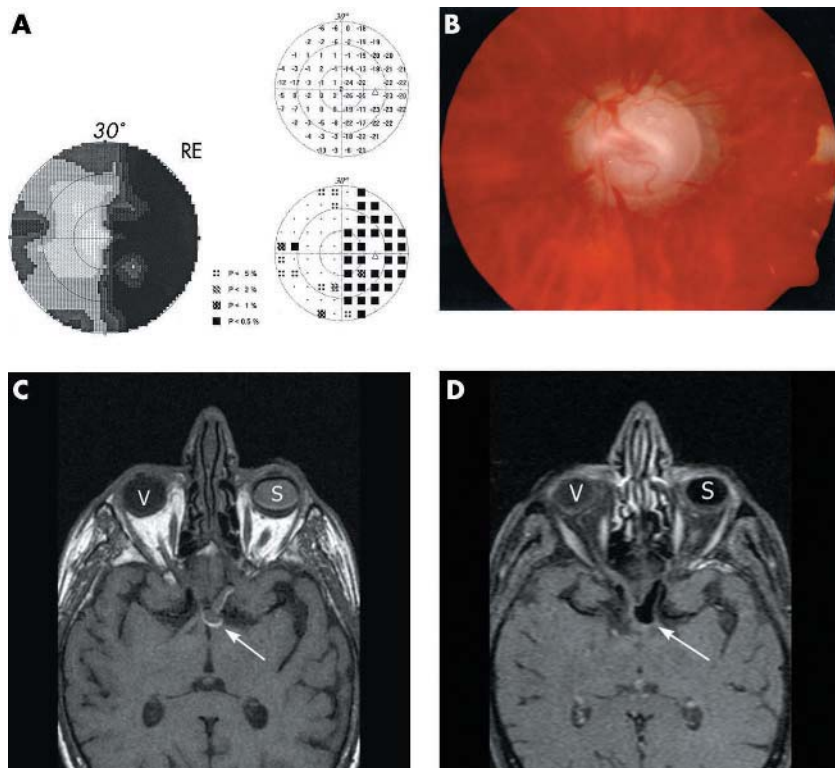
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**Visual field defect in association with chiasmal migration of intraocular silicone oil**

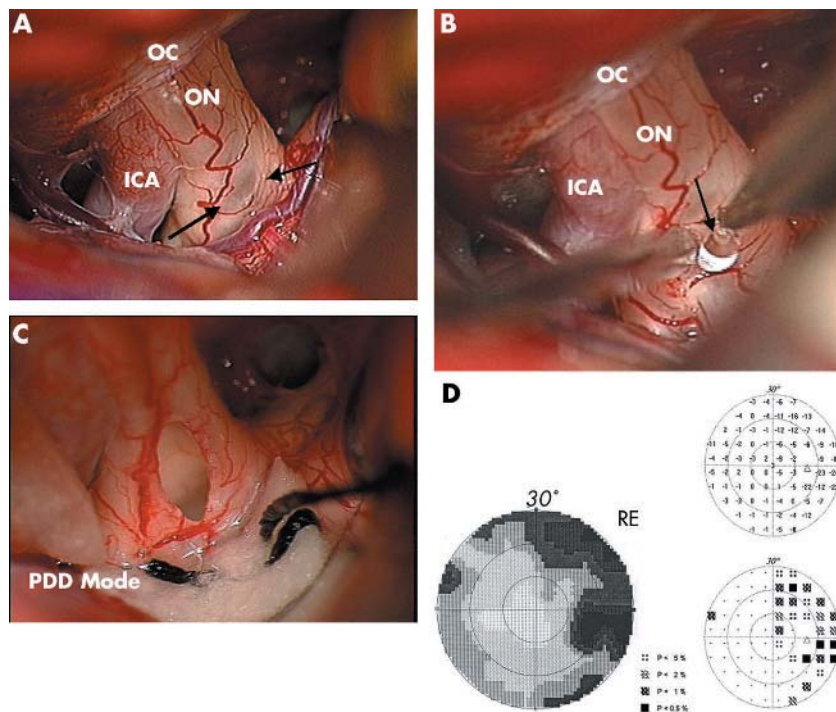
Silicone oil is used as a long term intraocular tamponade in vitreoretinal surgery for conditions such as rhegmatogenous retinal detachments. Complications such as silicone oil associated keratopathy, cataract formation, or emulsification with secondary glaucoma have been reported.<sup>1</sup> We report the unusual case of intracranial silicone oil migration with subsequent visual field defect in the fellow eye and the results of neurosurgical intervention

**Case report**

A 66 year old male patient had undergone cataract surgery and lens implantation on both eyes 20 months earlier. Six months after cataract surgery a retinal detachment was seen in the left eye which was first treated with pars plana vitrectomy and gas tamponade (15% C<sub>2</sub>F<sub>6</sub>). After a period of 4 months, a redetachment occurred and silicone oil (Acri.Sil-ol 5000, 5000 cps, Acri.Tec, Hennigsdorf, Germany)



**Figure 1** (A) Temporal hemianopia of the right eye. Visual acuity was 20/20. (B) The optic disc of the left eye shows atrophy and glaucomatous damage, the cup-disc ratio is 1.0. Note the reflex on the retinal surface, caused by the silicone oil tamponade. (C) Axial T1 weighted MRI scans demonstrate intraocular silicone oil (S) which is hyperintense compared to the normal vitreous (V). Note the hyperintense signal in the area of the intracranial portion of the optic nerve and the chiasm (arrow). (D) T2 weighted scans demonstrate hypointensive signals in the silicone filled eye (S) as well as in the area of the optic nerve and chiasm.



**Figure 2** (A) Left optic nerve (ON) before incision. Arrows point at translucent thinned perineural sheath with silicone oil beneath. OC, entrance to optic canal; ICA, internal carotid artery. (B) Silicone oil (arrow) evading from left optic nerve after incision of perineural sheath. (C) View into left optic nerve after complete removal of the silicone oil. The nerve has been hollowed out by the oil with just thin nerve walls remaining. (D) After intracranial surgery, a regression of the visual field defect was observed.

was used as a permanent tamponade. Postoperative visual acuity was 20/500 in the left eye. Twelve months later, the patient was referred to our institution for further evaluation of a temporal hemianopia of sudden onset in the right eye (fig 1A) and for treatment of elevated intraocular pressure in the left eye. At presentation, visual acuity was 20/20 in the right eye and light perception in the left eye. Intraocular pressure was in a normal range in the right eye and elevated to 35 mmHg in the left eye despite local antiglaucomatous monotherapy using latanoprost (Xalatan). Emulsified silicone oil was detected in the anterior chamber angle during gonioscopy of the left eye. Funduscopy revealed a glaucomatous excavation and atrophy of the optic nerve in the left eye with a cup-disc ratio of 1.0 (fig 1B); the retina was attached, with the silicone oil filling of the globe being incomplete. Magnetic resonance imaging (MRI) of the brain was then performed for further evaluation. T1 weighted MRI scan revealed a hyperintensive signal in the left vitreous cavity characteristic for silicone oil.<sup>2</sup> An identical hyperintensive signal was also observed in the left optic nerve and the left half of the optic chiasm (fig 1C); in contrast, in T2 weighted sections the silicone located in the optical system and in the vitreous cavity appeared hypointensive (fig 1D). In order to prevent a further progression of the visual field defect of the right eye, a decompression of the optic nerve seemed prudent. After informed consent, the patient underwent left subfrontal craniotomy and the left optic nerve and the optic chiasm were explored. No oil was found in the subarachnoid space or in the brain tissue. Therefore, the left optic nerve at the transition to the optic chiasma was slit open and the intrachiasmatic and intranervial silicone oil was removed by smooth suction and irrigation. The nerve was completely hollowed out by the oil with only thin perineural structures remaining (fig 2A, B, C). At the end the small opening in the nerve was covered with a collagen fleece coated with fibrin glue (Tachocomb H, Nycomed Pharma GmbH, Unterschleissheim, Germany). The neurosurgical intervention was performed without intraoperative or postoperative complications. In addition, a re-vitreotomy with gas tamponade was performed to remove the silicone oil from the vitreous cavity of the left eye. One month later, a regression of the visual field defect in the right eye was observed (fig 2D) and best corrected visual acuity was 20/32. Intraocular pressure in the left eye was normal without treatment after surgery.

### Comment

This case indicates that silicone oil can migrate intracranially under certain, yet unknown, conditions. Referring to the literature, there is only one case by Eller and co-authors<sup>3</sup> describing the intracranial migration of silicone oil in a patient with AIDS who had undergone vitrectomy with silicone oil tamponade for treatment of retinal detachment secondary to cytomegalovirus infection of the retina. As in our patient, there was a coincidence of uncontrolled high intraocular pressure associated with atrophy and glaucomatous damage of the optic nerve. It seems likely that elevated intraocular pressure and optic nerve atrophy allowed intraocular silicone oil to migrate intracranially, although a definite conclusion cannot be drawn from two

case reports. However, a histopathological study<sup>4</sup> previously demonstrated silicone cavities posterior to the lamina cribrosa in an silicone filled eye with glaucomatous nerve damage. The case presented in this report is unique because of the additional affection of the fellow eye as a result of optic nerve compression caused by silicone oil within the optic nerve sheath and its close proximity to the chiasm and the regression of the visual field defect after neurosurgical intervention.

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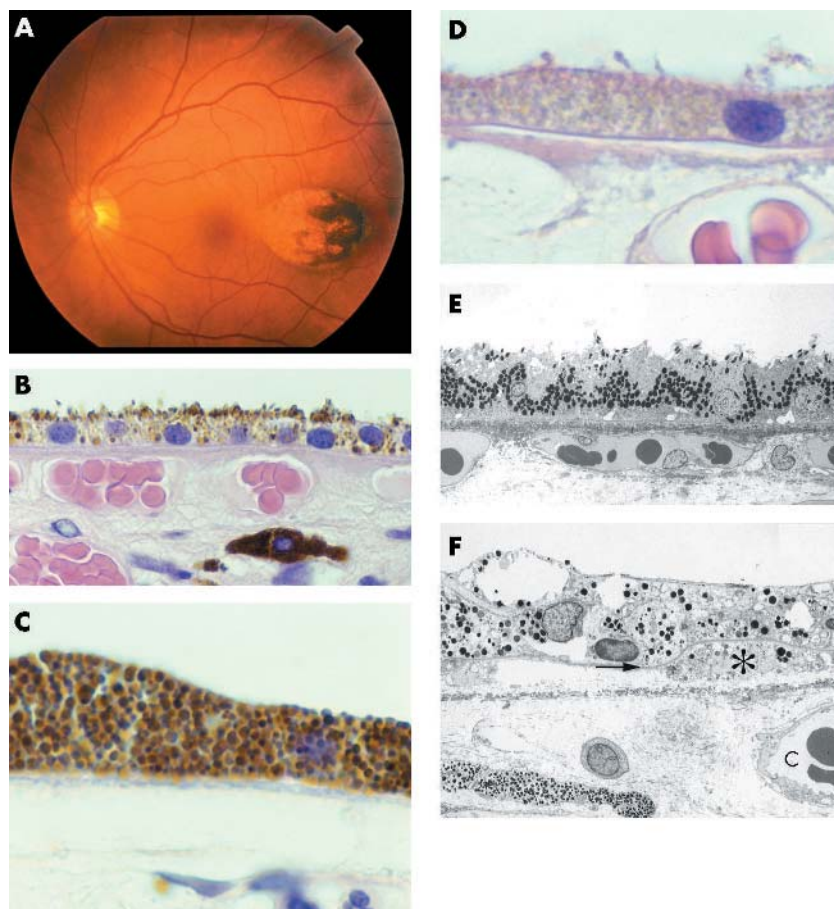
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**Figure 1** (A) Fundus photograph of the left eye showing an elliptical area of congenital retinal pigment epithelial (RPE) lesion temporal to the foveola. The lesion is depigmented in the nasal aspect with scalloped hyperpigmentation temporally. (B) Normal RPE cells, with prominent apical melanosomes and basal nuclei. Normal Bruch's membrane and choriocapillaris (haematoxylin and eosin  $\times 330$ ). (C) Hypertrophic, thickened retinal pigment epithelial cells from pigmented area of CHRPE. These are thickened, and packed with melanosomes, in both apical and basal areas (haematoxylin and eosin,  $\times 500$ ). (D) Atrophic, thinned RPE cells from depigmented areas of CHRPE lesion. Almost no melanosomes remain in these cells (haematoxylin and eosin,  $\times 500$ ). (E) Electron micrograph from hypertrophic RPE cells from pigmented areas of CHRPE. Nuclei are both apical and basal. Melanosomes are dense and rounded. Bruch's membrane is normal (electron microscopy  $\times 2000$ ). (F) Electron microscopy from the depigmented area of the CHRPE. RPE cells are atrophic and vacuolated, with very few small melanosomes. Bruch's membrane consists of the RPE basement membrane (arrow), a lucent thickened inner collagenous layer (below) extending to the elastic layer (middle dark layer). Note the RPE cell (\*) within the outer collagenous layer of Bruch's membrane. The choriocapillaris (C) is separated from this by a thickened lucent outer collagenous layer (right), but choriocapillaris (and endothelial cell basement membrane) are missing from most areas (central and left) (electron microscopy  $\times 2000$ ).

**Table 1** Summary of previously published histopathological findings in congenital hypertrophy of retinal pigment epithelium (RPE)

Author	Year	Age (years)	Type	Main histopathological findings					
				RPE cells		Pigment granules		Shape	Others
				Size	Density	Size	Density		
Kurz <sup>6</sup>	1962	19	Solitary	–	–	Large	Increased	Spherical	Hypigmented RPE (lacunae) Normal overlying photoreceptors
Buettner <sup>5</sup>	1975	62, 23	Solitary	Hypertrophy	–	Large	Increased	Spherical	Thickened Bruch's membrane Atrophic RPE (lacunae) Absent overlying photoreceptors
Shields <sup>11</sup>	1975	4	Grouped	Normal	Normal	Large	Increased	Ellipsoid	Normal overlying photoreceptors
Wirz <sup>12</sup>	1982	60	Solitary	Hypertrophy Hyperplasia	–	Large	Increased	Irregular	Atrophic outer retina Absence of lipofuscin
Champion <sup>7</sup>	1989	< 1	Solitary	Hypertrophy	–	Macro-melanosomes	Increased	Spherical	Small microvilli Abnormal melanogenesis
Lloyd <sup>8</sup>	1990	59	Solitary	Hypertrophy Hyperplasia	Increased	Macro-melanosomes	Increased	Spherical	Absence of lipofuscin Abnormal phagocytosis
Traboulsi <sup>10</sup>	1990	51	FAP	Hypertrophy Hyperplasia	–	Large	Increased	Spherical	RPE hamartoma
Parker <sup>13</sup>	1990	37,46	FAP	Hypertrophy	–	–	Increased	–	Choristoma
Kasner <sup>14</sup>	1992	61	FAP	Hypertrophy Hyperplasia	–	Large	Increased	Spherical	RPE hamartoma Abnormal melanogenesis
Regillo <sup>9</sup>	1993	2	Grouped	Normal	Normal	Large	Increased	Ellipsoid	Absent RPE hypertrophy Absent RPE hyperplasia
Present case	2005	62	Solitary	Hypertrophy Atrophy	Normal	Large	Increased	Spherical	Thickened Bruch's membrane

FAP, familial adenomatous polyposis with or without extracolonic manifestations (Gardner's syndrome).

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### Congenital hypertrophy of retinal pigment epithelium: a clinicopathological case report

Congenital hypertrophy of retinal pigment epithelium (CHRPE) is a peculiar congenital anomaly of the retinal pigment epithelium (RPE) diagnosed by its characteristic ophthalmoscopic appearance.<sup>1</sup> It is now realised that sporadic CHRPE is distinct from the similar appearing retinal lesions described in patients with Gardner's syndrome.<sup>2–4</sup> We recently enucleated an eye with a choroidal melanoma that also had a distinct area of solitary CHRPE with lacunae formation. This provided us with a unique opportunity to correlate clinical and histopathological features of a solitary CHRPE.

#### Case report

A 62 year old woman with a large cilio-choroidal melanoma was observed to have an elliptical retinal pigment epithelial lesion about 1 mm temporal to the foveola (fig 1A). The lesion was about 3 mm×2 mm in basal dimension and appeared flat. The lesion was depigmented in the nasal aspect with scalloped hyperpigmentation temporally. The eye was enucleated and processed routinely for histological examination.

On histopathological evaluation, cilio-choroidal melanoma was confirmed. In areas just outside the CHRPE lesion, the retinal pigment epithelium (RPE) was normal (fig 1B). The pathology of the "CHRPE" lesion varied across the lesion, correlating with the level of

pigmentation. Highly pigmented temporal areas showed hypertrophic RPE cells with loss of nuclear basal polarity and variable numbers of melanosomes (fig 1C). By contrast, RPE cells were thinned and atrophic in depigmented areas (fig 1D), with a marked reduction in (or loss of) melanosomes and decreased melanosome size. Between these areas, "transitional zones" showed variable changes. Electron microscopy confirmed that, in pigmented areas of CHRPE, hypertrophic RPE cells had dense rounded intact melanosomes, but little or no lipofuscin (fig 1E). In these areas, Bruch's membrane was normal. Depigmented areas had thin atrophic RPE cells, with cytoplasmic vacuoles and very few, much smaller melanosomes (fig 1F). Here, Bruch's membrane thickening (of the inner and outer collagenous layers) was most marked, with occasional insertion of RPE cells through the RPE basement membrane into the inner collagenous layer, but not beyond the elastic layer.

#### Comment

Only few reports exist regarding the histopathological findings of CHRPE and its variants (table 1). In solitary CHRPE, hypertrophic RPE cells with hyperpigmentation have been reported.<sup>5–8</sup> Additional findings have included presence of macromelanosomes<sup>7</sup> and absence of lipofuscin.<sup>8</sup> In contrast, the grouped CHRPE is composed of normal sized RPE cells with hyperpigmentation.<sup>9</sup> The CHRPE-like lesions seen in Gardner's syndrome show evidence of RPE hyperplasia and even hamartomatous changes in addition to RPE hypertrophy and hyperpigmentation.<sup>10</sup>

Our case shows many of the features previously described in CHRPE. Pathologically in our case, there appears to be gradation of changes from the pigmented areas to the non-pigmented areas. Depigmentation and

atrophy of RPE cells, starting with fragmentation of melanosomes progresses to gradual loss of melanosomes and RPE atrophy. Both the fragmentation of melanosomes and eventual atrophy appear to correlate with increasing changes in Bruch's membrane—namely, an increased thickness of the inner and outer collagenous layers, by electron lucent material may represent water, lipid or proteinaceous deposit. To our knowledge, this has not been reported previously, although review of an electron micrograph from the 23 year old patient of Buettner suggests that this feature may be present in a depigmented area of CHRPE.<sup>5</sup>

A close inter-reaction between the functions of RPE cells and Bruch's membrane is well recognised. It remains possible that the depigmentation of RPE cells caused the changes in the Bruch's membrane ("ancient" CHRPE). It is also possible that, in our patient, changes affecting Bruch's membrane are non-specific and are unrelated to CHRPE.

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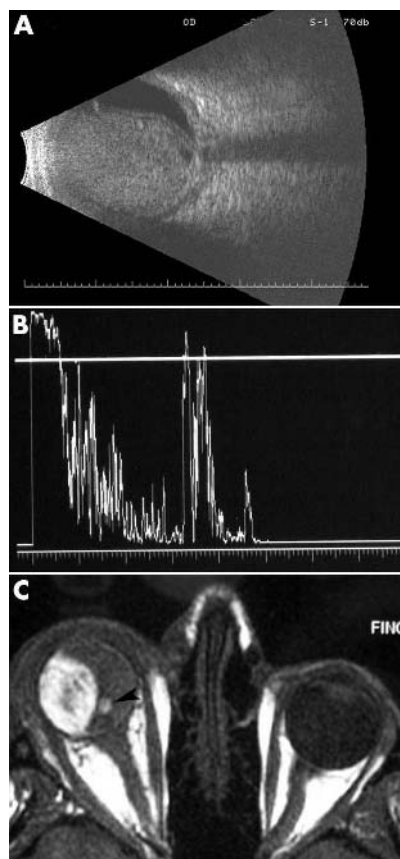
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### Finding malignant change in a necrotic choroidal melanocytoma: a clinical challenge

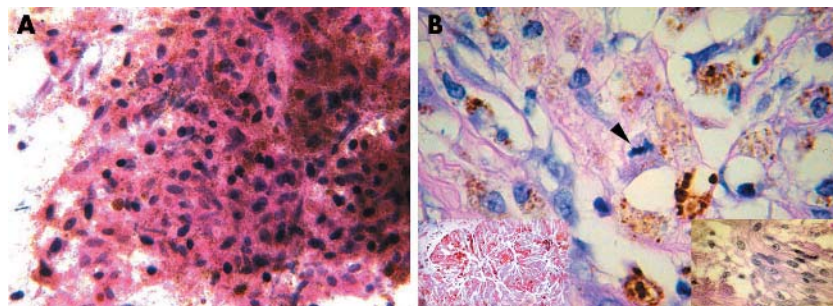
Melanocytic intraocular tumours can grow as to exceed their vascular supply, become necrotic, and induce inflammation. They present with atypical signs and become a diagnostic challenge. We present a case of a large melanocytic intraocular tumour that offered an atypical presentation, unexpected cytology, and finally diagnostic histopathology.

#### Case report

A 37 year old white woman presented with a painful right eye and vision loss. Examination



**Figure 1** (A) B-scan ultrasound demonstrated a large intraocular tumour with scleral thickening and retrobulbar oedema. There was almost no intrinsic vascularity noted within the tumour. No extrascleral tumour extension was noted. (B) A-scan ultrasonography of the right eye showed relative low internal reflectivity. (C) MRI of the orbits was significant for an intraocular tumour that displayed high signal intensity on T1 weighted images. On T2 weighted images it displayed low signal intensity. Note the small eccentric collar-button (arrow). There was no evidence of extraocular tumour extension.



**Figure 2** (A) The cytological preparations from FNAB showed very small, pigmented dendritic and epithelioid cells with small dark oblong nuclei. No mitoses or necrosis was present. Some of the very deeply pigmented cells seen were melanophages. These cells were naevus-like, there were no cells that were large enough or that had appropriate nuclear morphology to be called melanoma (original magnification  $\times 100$ ). (B) Histopathology of the enucleated eye showed a necrotic tumour (left inset; original magnification  $\times 100$ ) and a melanoma with a mitotic figure in the centre (arrow). These findings suggested malignant change (original magnification  $\times 100$ ).

showed no light perception, a relative afferent pupillary defect, a shallow anterior chamber, and an intraocular pressure of 58 mmHg. Dense vitreous haemorrhage and tumour obscured her fundus.

Three dimensional ultrasonography revealed vitreous haemorrhage, a total retinal detachment, and a large choroidal mass (fig 1A, B). Computed tomography and magnetic resonance imaging (MRI) of the orbits showed a 2 cm intraocular mass with a collar-button extension (arrow) consistent with a choroidal melanoma (fig 1C).

The patient participated in a discussion of the risks and benefits of treatment, found primary enucleation unacceptable, and preferred fine needle aspiration biopsy (FNAB) before treatment.

#### Cytology

Transvitreal FNAB showed small, well preserved, spindle-shaped, dendritic, and epithelioid cells with evenly distributed melanin pigmentation (fig 2A) and no evidence of malignancy. Both cytology and subsequent immunohistochemistry were consistent with melanocytoma.

Though a combination of topical glaucoma medications and oral prednisone decreased her ocular pain, the patient consented to enucleation.

#### Macroscopic examination

A large evenly pigmented choroidal mass measuring 12 mm in height and  $17 \times 18$  mm in greatest dimension was noted. The tumour extended from the ciliary body to the optic disc.

#### Light microscopy

Extensive infarction of the tumour was present. The cell outlines revealed a tumour composed of uniform large and heavily pigmented cells with round, small central nuclei. Many of these cells were magnocellular and histopathologically consistent with melanocytoma. However, distinct cells with larger nuclei and prominent nucleoli were present singly and in small clusters. In these areas, rare atypical mitoses were noted. These features were diagnostic of malignant transformation of a large melanocytoma (fig 2B). At 6 months post-enucleation there is no evidence of metastatic disease.

## Comment

Melanocytomas are darkly pigmented tumours that commonly arise at the optic nerve margin. They also occur in the iris, ciliary body, and the choroid. Though largely benign and stationary, melanocytomas can (albeit rarely) undergo malignant transformation.<sup>1-8</sup> When this occurs, it can be difficult to differentiate between melanocytomas and malignant melanomas by ultrasonography or fluorescein angiography. Adenoma and adenocarcinoma of the retinal pigment epithelium should also be considered.

In this case, FNAB did not establish the diagnosis of a malignant melanocytoma and clearly demonstrates the potential danger of relying on FNAB (alone) for the diagnosis of atypical and necrotic intraocular tumours. Foci of malignant change were missed, leading to the diagnosis of melanocytoma. Fortunately, enucleation was performed.

This case also demonstrates that melanocytomas can undergo necrosis resulting in atypical features such as opaque media, pain and inflammation. They can induce vaso-occlusive disease within the optic nerve, ischaemic necrosis of the tumour, ischaemic retinopathy, neovascular glaucoma, and melanocytic glaucoma.<sup>9</sup> Since both necrotic melanocytomas and necrotic malignant uveal melanomas can present with the same acute symptoms (pain, inflammation, and an elevated intraocular pressure), these findings can detract the clinician's ability to differentiate between these tumours.

Malignant change in a melanocytoma is a rare event. It is actually more common for a uveal melanoma to undergo spontaneous necrosis and present with intraocular inflammation, haemorrhage, secondary neovascularisation, and orbital inflammation. Such necrotising tumours have an increased incidence of penetration through the Bruch's membrane, scleral invasion, and extrascleral extension.<sup>10</sup> Clearly, large necrotic intraocular tumours can be a diagnostic challenge for both clinician and pathologist.

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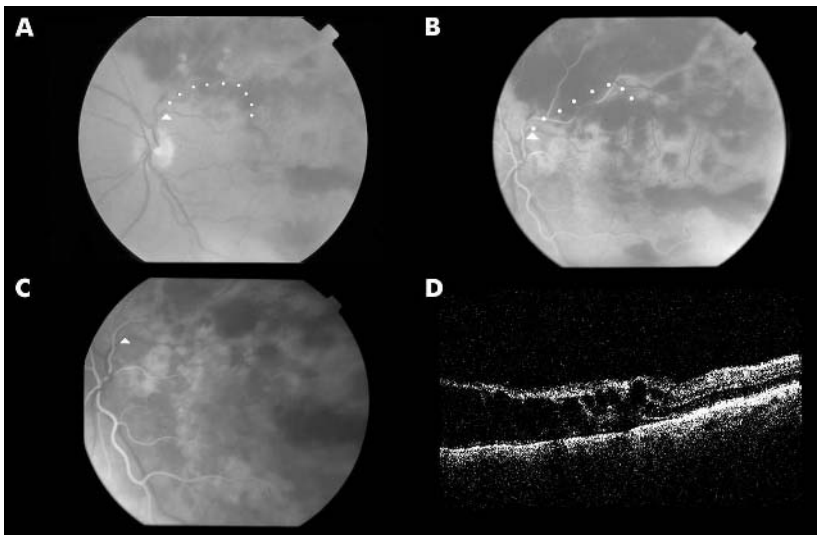
## Improvement after transvitreal limited arteriovenous crossing manipulation without vitrectomy for complicated branch retinal vein occlusion using 25 gauge instrumentation

Although arteriovenous adventitial sheathotomy (AAS) has been proposed as an alternative treatment for patients with branch retinal vein occlusion (BRVO) complicated by macular haemorrhage, persistent macular oedema after grid laser photocoagulation,

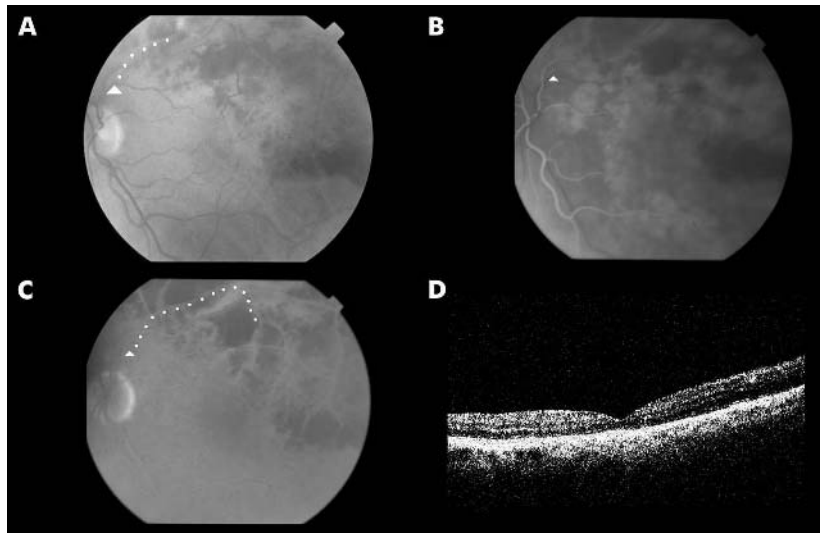
and macular ischaemia, the inner retinal incision may increase the risk of retinal detachment and spontaneous vitreous haemorrhage.<sup>1-3</sup> Han *et al.*<sup>2</sup> recently proposed that incomplete separation of the common adventitial sheath without lysis may achieve comparable results. Thus, we propose transvitreal limited arteriovenous crossing manipulation (LAM) without vitrectomy as an alternative to AAS.

## Case report

A 70 year old man with a medical history of hypertension, presented with BRVO of 14 weeks' duration, visual acuity of 7/200, intraretinal macular haemorrhages, macular oedema assessed by ocular coherence tomography, and capillary non-perfusion on fluorescein angiography (fig 1). After informed consent and institutional review board approval was obtained, the patient underwent LAM without vitrectomy using the 25 gauge transconjunctival standard vitrectomy system (MADLAB, Bausch & Lomb, St Louis, MO, USA). Next, the blunt, flexible extendable pick (MADLAB) was introduced into the vitreous, and, once extended, makes a slit in the internal limiting membrane approximately 1.5 mm next to the pathological arteriovenous crossing. Then, LAM was initiated by first lifting the proximal portion of the artery followed by the portion distal to the crossing. Then, the artery was lifted at the crossing site, stretching but not severing the common adventitial sheath. Visualisation of clot dislodgement and reperfusion were noted. No vitrectomy was performed and no vitreous cutter was used during the procedure. There was no evidence of posterior vitreous detachment.



**Figure 1** Preoperative fundus photography, fluorescein angiography, and optical coherence tomography. (A) Fundus photography of the left eye exhibiting severe intraretinal haemorrhage and macular oedema secondary to superotemporal secondary order branch retinal vein occlusion. Arrowhead denotes site of occlusion. The course of the vein is outlined by the white dots underneath and points towards 2 o'clock from the optic disc. (B) Fluorescein angiography of the left eye at 12 seconds exhibiting widespread blocked fluorescence secondary to haemorrhage, hyperfluorescence of the vessel wall, and extensive capillary dropout estimated at 10 disc diameters with vessel "pruning." Arrowhead denotes site of occlusion. The course of the occluded vein is better outlined in this angiogram by the underlying white dots. (C) Fluorescein angiography of the left eye at 4 minutes exhibiting consistent capillary dropout, blocked fluorescence secondary to haemorrhage, and extensive leakage along capillary vessel walls. Arrowhead denotes site of occlusion. (D) Optical coherence tomography of the left eye exhibiting extensive macular oedema with large cystic spaces in the foveal region. Foveal thickness was calculated to be 512 µm.



**Figure 2** Postoperative fundus photography, fluorescein angiography, and optical coherence tomography. (A) Fundus photography of the left eye exhibiting marked resolution of intraretinal haemorrhage and macular oedema, particularly in the foveal region. Arrowhead denotes site of previously complete occlusion. The course of the now ghost vessel is outlined by the white dots underneath. (B) Fluorescein angiography of the left eye at 10 seconds exhibiting noticeably decreased blocked fluorescence secondary to haemorrhage, continued hyperfluorescence of the vessel wall, and extensive but decreased capillary dropout estimated at approximately 5 disc diameters. Persistent, but less severe, vessel "pruning" was also evident. Arrowhead denotes site of previously complete occlusion. (C) Fluorescein angiography of the left eye at 6 minutes exhibiting decreased capillary dropout, persistent blocked fluorescence secondary to haemorrhage, and decreased leakage along capillary vessel walls. Decreased leakage is particularly noted in the foveal region. Arrowhead denotes site of occlusion. The course of the occluded vein is outlined in this angiogram by the underlying white dots. (D) Optical coherence tomography of the left eye exhibiting markedly decreased macular oedema and the absence of cystic spaces. Foveal thickness was calculated to be 133  $\mu\text{m}$ .

At the 2 month postoperative visit, the patient's visual acuity was 20/40. Fundus photography and fluorescein angiography revealed markedly decreased intraretinal haemorrhages and good macular perfusion, respectively. Macular thickness decreased from 512  $\mu\text{m}$  to 133  $\mu\text{m}$  on optical coherence tomography (fig 2). No cataract progression was noted and intraocular pressure remained stable throughout the postoperative course. The patient has remained stable for over 12 months.

### Comment

Our group has previously published a case report of 25 gauge AAS with vitrectomy where improvement was noted in visual acuity, macular thickness (as measured by optical coherence tomography), and refixation (as shown by scanning laser ophthalmoscopy).<sup>4</sup> Han *et al*<sup>2</sup> postulated that incomplete separation of the common adventitial sheath may be an alternative to AAS. The LAM without vitrectomy procedure may provide a minimally invasive way of clot dislodgment and reperfusion without need for large retinal incisions near retinal vessels as with AAS.

Although this intervention may suggest benefit, it is certainly possible that the macular oedema spontaneously resolved as a result of reperfusion from recanalisation. We are uncertain as to which of these factors (LAM or recanalisation) resulted in significant improvement. It is our belief that the reperfusion after the procedure was mainly responsible for the dramatic clearing of haemorrhage and the resolution of the macular oedema. A prospective, randomised trial examining the potential

benefits of 25 gauge without vitrectomy and 20 gauge AAS with vitrectomy procedures for BRVO is warranted.

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The blunt 25 gauge nitinol flexible extendable retinal pick and the transconjunctival standard vitrectomy system (TSV) are disclosed to Bausch & Lomb Surgical, St Louis, MO, USA. The Microsurgery Advanced Design Laboratory (MADLAB) at the Doheny Retina Institute may receive royalties related to the sale of these instruments mentioned in this article to defray operating costs. The authors have no proprietary interests in any instrumentation in this article.

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### "Ecstasy" induced immunosuppression and herpes zoster ophthalmicus

It is uncommon for younger patients to develop herpes zoster ophthalmicus (HZO) without underlying immunocompromise.

3,4-Methylenedioxyamphetamine (MDMA, "ecstasy") is a widely abused psychomotor stimulant shown to cause a transient immunosuppression.<sup>1-4</sup> In this report, we present the relation between MDMA induced immune dysfunction and the development of HZO in a previously healthy young male.

### Case report

A 24 year old African-American male without significant past medical history presented with an eruptive, vesicular rash on his left forehead and eyelid consistent with the diagnosis of herpes zoster ophthalmicus (fig 1). Although he reported using safe sexual practice and denied injecting drug use, he admitted using an oral drug, ecstasy, three times a day for 4 days before the development of his symptoms. He tested negative for HIV and underlying malignancy, and slowly improved on intravenous aciclovir during his admission.

Varicella zoster reactivation is a potential complication of immunosuppression. Predisposing factors to reactivation include increasing age, neoplastic diseases, HIV, immunosuppressive therapy, or debilitating systemic disease.<sup>5</sup> Since zoster in patients under 50 years old is uncommon, a search for predisposing factors is indicated. It has been shown, in short term studies, that ecstasy use results in immune suppression.<sup>1-4</sup> Therefore, we believe that our patient's prolonged use of ecstasy facilitated the development of HZO.

3,4-Methylenedioxyamphetamine is a widely abused psychomotor stimulant with behavioural effects similar to those elicited by amphetamines and hallucinogens. MDMA has become a popular drug of abuse over the past two decades.<sup>3</sup> A study in 1988 found that 39% of students on a college campus admitted to having taken the drug at least once in the previous year.<sup>6</sup> Surveys have also shown a steady increase in MDMA use in 8th, 10th, and 12th graders.<sup>7</sup> MDMA produces a profound euphoria, heightened feelings of empathy, emotional warmth, and self acceptance.<sup>7</sup> Adverse effects include hyperthermia, seizures, cardiac arrhythmias, hepatotoxicity, and many psychiatric disorders.<sup>8</sup> There has been an increase in reports of presumed ecstasy related fatalities and severe adverse effects such as aortic dissection and myocardial infarction.<sup>9 10</sup>

Connor *et al*<sup>1 3 4</sup> demonstrated that acute MDMA administration produced a variety of time dependent neurochemical, endocrine, and immune alterations in rats. Their studies



**Figure 1** A 24 year old patient developed herpes zoster ophthalmicus after using the drug "ecstasy."

provided evidence that a single administration of MDMA induces a rapid and sustained suppression of induced lymphocyte proliferation and a decrease in circulating lymphocytes. The alterations in immune function were accompanied by a significant increase in plasma corticosterone concentrations. They hypothesised that users of MDMA may have reduced immunocompetence and therefore display increased susceptibility to both infectious and neoplastic disease.<sup>1</sup>

In a study by Pacifici *et al*<sup>2</sup> it was shown that MDMA administered to humans at doses compatible with its recreational use caused rapid changes in certain immunological parameters. They demonstrated that 1 hour after administration, there was a significant reduction in CD4 T cell count and an increase in natural killer cell count. These changes in immune function were also linked to increased cortisol concentration.<sup>2</sup>

### Comment

The studies discussed above provide evidence for the relation between MDMA and immune dysfunction. We have demonstrated a case where MDMA abuse led to the development of herpes zoster ophthalmicus. This relation has important implications for the examination of an atypical infectious process. Given the rising use of MDMA, especially among high school and college students, this consequence is a significant public health concern. Not only is it important to gather history regarding the use of illicit drugs, but also to stress the negative impact this drug can have on potential users. We anticipate more reports of infectious diseases related to MDMA use. Further studies are necessary to define the mechanisms by which MDMA causes immune dysfunction and to determine long term effects in humans.

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### Reversible posterior leucoencephalopathy syndrome: a cause of temporary cortical blindness

Reversible posterior leucoencephalopathy (RPLS) describes a syndrome of headaches, confusion, seizures, and visual disturbances associated with transient characteristic lesions on neuroimaging, predominantly affecting the posterior region of the brain.<sup>1</sup> RPLS affects patients with hypertension, eclampsia, renal failure, and those on immunosuppressants and chemotherapeutic agents. We discuss a case of RPLS that presented primarily with visual symptoms.

### Case report

A 10 year old boy with B cell acute lymphoblastic leukaemia affecting his maxilla was commenced on chemotherapy with intravenous vincristine and cyclophosphamide, oral prednisolone and folinic acid, together with intrathecal methotrexate, cytarabine, and hydrocortisone for central nervous system extension.

Ten days after the onset of chemotherapy he complained of sudden bilateral visual loss. On examination his visual acuity was perception of light in both eyes. His pupils were equal and reactive to light and funduscopy was normal; there was no other neurological deficit. His blood pressure was elevated at 150/102 mm Hg. Over the next 24 hours his speech and conscious state became disturbed, his Glasgow coma scale (GCS) score dropped to 7/15 and he developed increased tone and clonus on his left side. A computed tomography (CT) scan showed symmetrical areas of low density involving both occipital and parietal regions associated with mild swelling. A magnetic resonance imaging (MRI) scan, 24 hours after the onset of symptoms, revealed extensive high signal intensity changes on T<sub>2</sub> weighted sequence involving

the white matter of the occipital and parietal regions (fig 1). Cerebral arteriography revealed a normal intracranial circulation.

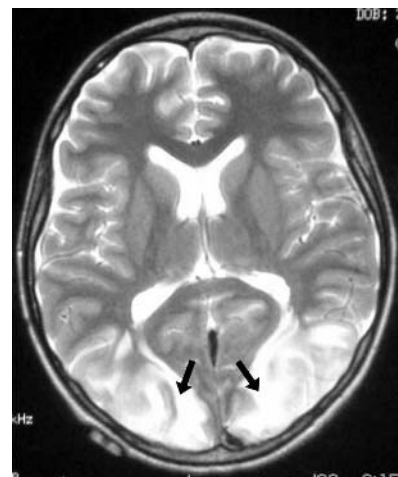
Nifedipine was prescribed to control the patient's mean arterial blood pressure to approximately 90 mm Hg. The chemotherapy regimen was not changed because he was between courses. His GCS score and speech improved. Two weeks later, his visual acuity had improved to 6/12 in both eyes. A repeat MRI scan, 23 days after the first study, showed a dramatic improvement with slight residual signal change in the parieto-occipital region on T<sub>2</sub> weighted images (fig 2). Nine months after the onset of symptoms, and having completed his chemotherapy, he maintains a visual acuity of 6/6 in the right eye and 6/9 in the left eye, with full visual fields and normal colour vision.

### Comment

RPLS is characterised by altered mental status, headache, seizures, and visual disturbance, often occurring in patients receiving chemotherapy. Seventy six per cent of children with RPLS have at least three of these four signs.<sup>2</sup> The most common visual abnormality is cortical blindness but homonymous hemianopia, visual neglect, and blurred vision can also occur. Patients are commonly hypertensive at presentation, but this may be mild.

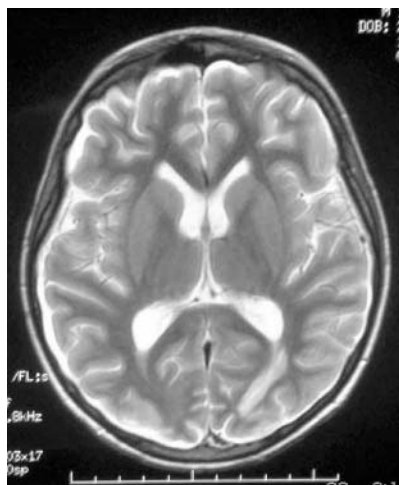
As illustrated, areas of temporarily increased signal intensity (representing white matter oedema) in the posterior regions of the cerebral hemispheres on T<sub>2</sub> weighted MRI sequences are characteristic.<sup>3</sup> Sparing of the calcarine fissure and paramedian occipital lobe structures aids in the differentiation of RPLS from bilateral infarction of the posterior cerebral artery territory.<sup>4</sup> Although the parieto-occipital region is principally affected, the syndrome may affect the frontal lobes, basal ganglia, brainstem, or cerebellum.<sup>1</sup>

While not completely understood, the cerebral oedema is thought to result from increased vascular permeability and cerebral hyperperfusion as a result of a combination of autoregulatory failure in the cerebral vessels and hypertension.<sup>4</sup> This patient was treated with methotrexate and cytarabine,



**Figure 1** Axial T<sub>2</sub> weighted magnetic resonance imaging scan, 24 hours after the onset of symptoms, showing high signal intensity involving the white matter of both occipital lobes (arrows).





**Figure 2** Axial T<sub>2</sub> weighted magnetic resonance imaging scan, 23 days later, showing a reduction in signal intensity at the occipital lobes.

both of which have been reported to cause RPLS.<sup>5,6</sup> These drugs may have a direct cytotoxic effect on vascular endothelial cells, may induce and exacerbate hypertension and may lower seizure threshold.<sup>7</sup> Intrathecal chemotherapy may cause cerebral vasospasm, contributing to cerebral vascular autoregulation impairment.<sup>8</sup> The parieto-occipital region may be preferentially involved because of less extensive sympathetic innervation of the posterior cerebral circulation compared to other intracranial arteries,<sup>9</sup> which reduces the ability of an already impaired cerebral autoregulation to compensate.

This case illustrates that the neurological impairment from RPLS is substantially reversible with prompt treatment of the associated hypertension and the dose reduction or discontinuation of inciting drugs.<sup>4</sup> It highlights the importance of the recognition of RPLS and the prompt start of appropriate treatment to prevent irreversible brain injury.

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## Morquio syndrome: electron microscopic findings

Mucopolysaccharidoses (MPS) are a group of hereditary storage diseases secondary to deficiencies of lysosomal enzymes. MPS type IV is known as Morquio syndrome.<sup>1</sup> In "classic" or type A Morquio syndrome the deficient enzyme is N-acetylgalactosamine-6-sulphate-sulphatase.<sup>2</sup> Morquio syndrome has been associated with cataract,<sup>3</sup> optic atrophy,<sup>4</sup> tapetoretinal pigmentary degeneration,<sup>4,5</sup> and corneal clouding.<sup>4,6–8</sup> We report a case of type A Morquio syndrome with electron microscopic findings.

## Case report

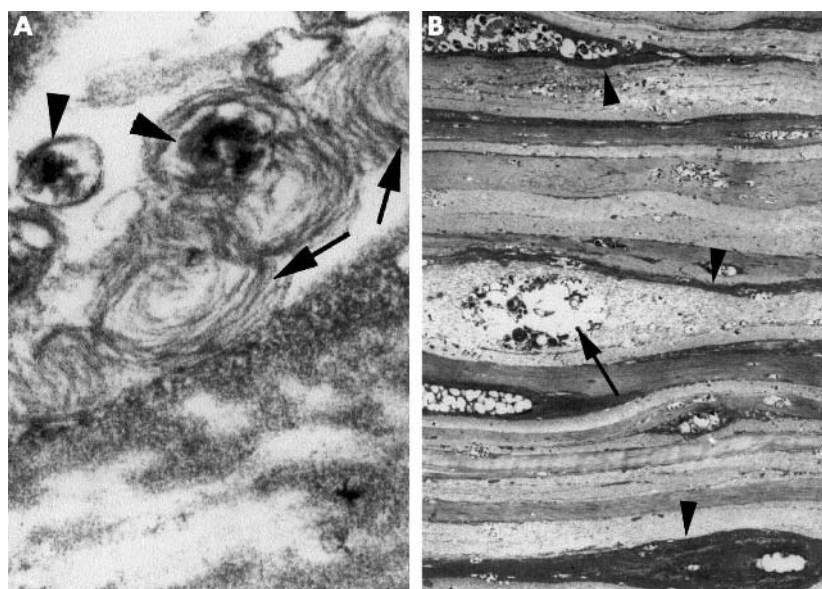
A 38 year old man was referred for consideration of left corneal grafting for progressive corneal haziness of several years' duration. He was diagnosed with Morquio syndrome in childhood on the basis of severe growth retardation, skeletal dysplasia, and facial dysmorphism. Subsequently, a diagnosis of

type A Morquio syndrome was confirmed on enzyme assay of skin fibroblasts. On examination visual acuities were 6/12 right eye and 6/18 left eye. There was bilateral corneal oedema and stromal haze, greater on the left, precluding fundal examination. His intraocular pressures were normal and his angles, although poorly visualised, appeared open.

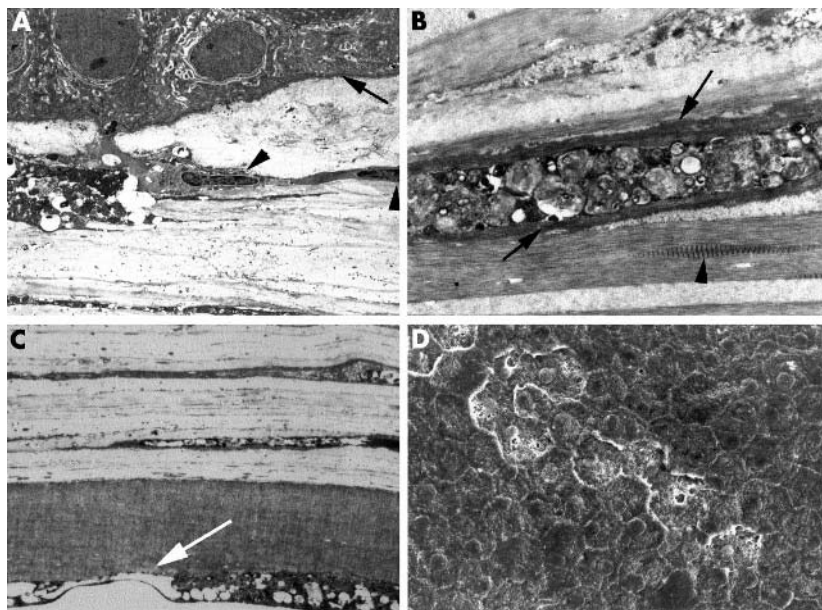
Following an uneventful left penetrating keratoplasty the host cornea was examined by light, transmission and scanning electron microscopy.

On light microscopy, the basal cells of the epithelium were swollen as a result of oedema but both the epithelium and Bowman's membrane were of uniform thickness. In paraffin sections the spaces around the keratocytes were enlarged, but this was because of fixation artefact and this abnormality was not seen in the toluidine blue sections. The stroma around the enlarged spaces contained a thin dense border which stained with Alcian blue but not with colloidal iron/periodic acid Schiff or mucicarmine. Descemet's membrane and the endothelial monolayer were of uniform thickness. In the toluidine blue sections the stroma appeared hypercellular and had a disorderly lamellar pattern. Both the keratocytes and the endothelium contained numerous intracytoplasmic bodies.

At the ultrastructural level, the epithelium contained abnormal inclusion bodies. In areas of the epithelium, the apical portion of the basal cells was packed with small clear membrane-bound vacuoles which decreased in numbers in the wing cell and superficial cell layers. In other sectors the epithelium appeared normal. There were sectors where the basement membrane was markedly thickened and Bowman's membrane was discontinuous in small areas where fibrocytic and/or inflammatory cells were invading beneath the basal layer. Numerous small unmyelinated nerves were distributed throughout the basal cell layer.



**Figure 1** (A) Within the cytoplasm an irregular electron dense mass (arrowhead) is surrounded by concentric membranes (arrow). A granular deposit is present in the stroma around the cell membrane (\*) ( $\times 120\,000$ ). (B) Normal keratocytes were absent from the stroma—the cytoplasm of each cell contained inclusions although the content was variable. Some cells were disrupted by the volume of the inclusions (arrow): many of the cells were surrounded by a layer of electron dense granular material (arrowheads). The corneal lamellae were distorted by the swollen cells ( $\times 3800$ ).



**Figure 2** (A) In some sectors Bowman's layer was absent and the epithelium was in contact with fibrous tissue over a thick basement membrane (arrow). Intracytoplasmic bodies were absent from the fibroblasts within the fibrous tissue (arrowheads) ( $\times 3800$ ). (B) At lower magnification the inclusions appear to be amorphous in parts, but this represents the concentric lamellar material. The lamellae contain spindle-shaped strips of wide banded collagen (arrowhead). The cell with preserved cytoplasm containing inclusions is surrounded by a layer of electron dense granular material (arrows) ( $\times 9600$ ). (C) Descemet's membrane is of normal thickness. The endothelium contains membranous inclusions, which accumulate to such a level that the cells are cystic (arrow) ( $\times 4500$ ). (D) When examined by scanning electron microscopy, the posterior endothelial surface is nodular as a result of the accumulation of intracytoplasmic inclusions. Linear areas of cell disruption are present ( $\times 850$ ).

Every keratocyte, to a varying degree, appeared to be involved in the overproduction of mucopolysaccharide and glycolipids. Intracytoplasmic inclusions in the form of multilaminar bodies, fingerprint whorl patterns, fibrillogranular inclusions, small lipid vacuoles, and clear vacuoles were all observed (figs 1 and 2). The collagen bundles in the stromal lamellae appeared normally aligned but scattered throughout the stroma were distended spaces or lacunae occupied by disrupted keratocytes and these distorted the lamellae. In the stromal lamellae around the keratocyte lacunae, there was deposition of an encircling layer of granular material and bundles of wide banded collagen fibres were present in the surrounding corneal stroma (fig 2).

The endothelial cell cytoplasm contained similar abnormalities to those described in the keratocytes with small clear membrane bound vacuoles which had fused to form large empty cytoplasmic spaces causing the cell membranes to collapse. By scanning electron microscopy the endothelial cells possessed a cobblestone appearance because of numerous small nodular bulges on the apical surface but the majority were of normal size and shape and the hexagonal integrity was maintained. Small linear groups of degenerate cells with cytoplasmic disruption were scattered throughout the monolayer. The graft remained clear with no evidence of recurrence 2 years postoperatively with a best corrected visual acuity of 6/6.

### Comment

This patient had corneal opacification but none of the other common ocular associations of Morquio syndrome.<sup>3-8</sup> As with the

two previous studies which investigated the corneal opacification type A Morquio syndrome with electron microscopy.<sup>7,8</sup> We found the most obvious abnormality to be mucopolysaccharide inclusions in the form of intracytoplasmic, multilaminar concentric bodies particularly within keratocytes but also affecting the epithelium and endothelium. The degree of keratocyte disruption was striking and possibly related to the late stage of the disease in this case. We confirmed the previous findings of bundles of abnormal collagen fibres, which were present in the corneal stroma around the lacunae<sup>6,8</sup> and of areas of epithelial membrane bound vacuoles.<sup>7</sup>

We identified areas of basement membrane thickening and areas where Bowman's layer was discontinuous with fibrocytic and/or inflammatory cells invading beneath the basal layer. Numerous small unmyelinated nerves were distributed throughout the basal cell layer. These epithelial changes have not been commented on previously and are possibly secondary to the epithelial oedema which had been identified in this case by light microscopy.

Although early recurrence of opacification has been reported<sup>4</sup> the corneal graft in this case remains clear at the 2 year follow up.

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### Importance of early morning intraocular pressure recording for measurement of diurnal variation of intraocular pressure

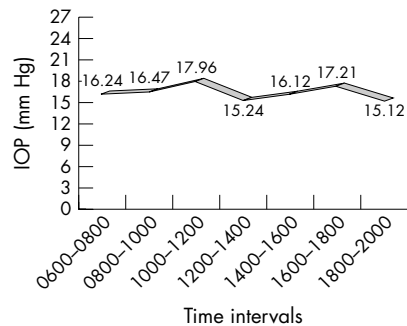
Intraocular pressure (IOP) is subject to cyclic fluctuations through the day. Diurnal variation in glaucoma was first reported in 1898.<sup>1</sup> Duke-Elder and others reported high IOP on awakening.<sup>2-6</sup> There is therefore a chance of missing a pressure elevation with single readings.

Phasing is mainly carried out from 0900 to 1800 hours, thereby missing any early morning spikes of IOP. Any delay in the first measurement will miss variations in IOP that are present immediately on waking.<sup>4,7</sup> We carried out a retrospective study, where patients under the care of the senior author (CL) are routinely admitted for phasing in order to obtain an early morning recording of IOP immediately on awakening.

### Report

A total of 93 patients (mean age 73.2 years) were admitted for phasing under the care of the senior author between December 1997 and August 2002. The first measurement of IOP took place between 0800-1000 hours. Further measurements were taken every 2 hours until 2000 hours. The final measurement was taken early morning (between 0600-0800 hours) immediately on awakening. Goldmann applanation tonometry was carried out by experienced staff.

In all, 17 patients requiring treatment or change in management for their glaucoma were identified. Of these, 13 were identified as having POAG. Four patients out of 13 (30.8%) showed peak IOP (23-28 mm Hg,



**Figure 1** Mean IOP during phasing in our unit at different intervals.

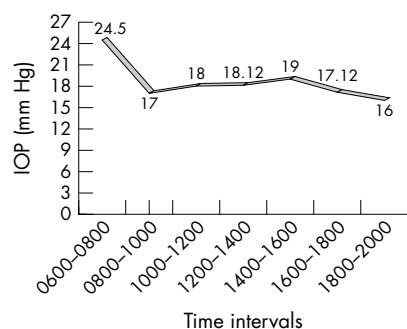
mean 24.5) in the early morning (0600–0800 hours) immediately on awakening (fig 2). These cases would have been missed if routine outpatient measurements of diurnal variation only had been carried out.

**Comment**

The evaluation of IOP is usually based on measurements performed during office hours. As IOP is considered a major risk factor for glaucoma, an undetected IOP spike could be the missing link that has not been taken into account.<sup>8</sup> Various investigators have shown that IOP just after awakening is increased.<sup>4,7</sup> Phasing during routine office hours only would miss this. In our series we detected four patients with high IOPs in the early morning.

Goldmann tonometry was done in the sitting position, which might have reduced our chance to detect more cases, as IOP could be higher in the supine position.<sup>9</sup> We did our best to take measurements immediately on awakening although there was a time delay in some patients because of reduced mobility. These limitations could have been avoided to some extent by using a portable tonometer such as the Perkins tonometer.

The disadvantages of our study were its retrospective nature, small population of study, and different members of staff involved in IOP measurements, thereby introducing variability. Staff members were not blind to the results but they do not have any vested interest in whether the early morning result is important. IOP could be overestimated in patients with thicker corneas, which we have not controlled for. We believe this factor, and its own diurnal variation, should be taken into consideration in future studies.



**Figure 2** Mean IOP variation in the four patients detected with early morning IOP spikes.

Based on our study we believe that more cases of glaucoma could be identified by early morning measurement of IOP during phasing.

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**Autoimmune retinopathy associated with intravesical BCG therapy**

Intravesical BCG is used as adjunctive immunotherapy for superficial carcinomas of the urinary bladder. Endophthalmitis and uveitis are the reported ocular complications.<sup>1–3</sup> We report an unusual case of autoimmune retinopathy in a 58 year old man treated with intravesical BCG. The clinical features resembled CAR (cancer associated retinopathy) but there was no serum reaction to the CAR autoantigen.<sup>1</sup> We believe that this is the first reported case of autoimmune retinopathy caused by BCG treatment.

**Case report**

A 58 year old white man was referred with reduced vision and photophobia for 4 months following a 6 week (one instillation per week) course of intravesical BCG immunotherapy for

recurrent transitional cell bladder carcinoma. On examination, after 4 months of complaints, the visual acuity was 6/24 in each eye and N18 for near. Anterior segment evaluation revealed bilateral early nuclear cataracts. The anterior chamber and vitreous were quiet. The fundus examination showed mildly attenuated arterioles (RE>LE) with a mild pigmentary disturbance in the mid-periphery. Intraocular pressure was normal. Colour vision showed a protan-deutan axis in both eyes. There was no family history of colour blindness. Full field electroretinogram (ERG) amplitudes were sub-normal for photopic and scotopic conditions in both eyes. Latency was normal. An electro-oculogram (EOG) was borderline normal in both eyes. Automated perimetry revealed bilaterally enlarged blind spots. Fundus fluorescein angiography showed narrowed arterioles. The choroid was normal. Serum analysis revealed no reaction to 23 kD CAR autoantigen.<sup>1</sup> However, an unusual reaction which may represent a form of autoimmune degeneration was reported by the laboratory.

The photophobia increased over the next 2 months. A repeat full field ERG revealed that photopic responses were indistinguishable from noise in the right eye and just detectable in the left eye. On examination, visual acuity in each eye was 6/24. Oral prednisolone 20 mg daily was commenced. After a year it was decided to stop it as there was no improvement in vision. On his last follow up visit, the visual acuity was counting fingers in each eye and N36 at 10 cm. This had remained stable for 3 years. The photophobia was stable owing to dense cataracts and was well controlled with dark glasses. The fundus remained unchanged. The primary bladder carcinoma was unchanged and no secondaries were found.

**Comment**

BCG has been used for the treatment of bladder cancers for many years. Ocular toxicity caused by BCG resulting in granulomatous uveitis with vitiligo has been reported.<sup>1</sup> The first case of endogenous endophthalmitis after use of BCG for metastatic bladder carcinoma was reported in 1988. The patient developed bilateral infiltrative retinitis and vitritis. Vitrectomy revealed *Mycobacterium bovis*.<sup>2</sup>

CAR is associated with melanomas, cancers of lung, cervix, colon, bladder, prostate, and breast. Progressive visual loss, night blindness with ring scotoma, and markedly abnormal ERG findings were described. Fundus revealed mild retinal pigmentation.<sup>2</sup> Histopathology of CAR affected eyes revealed loss of retinal receptors and atrophic changes in the retinal pigment epithelium (RPE), most marked in the macula. An abnormal state of RPE hypersensitivity contributing to retinal degeneration has been reported. Grunwald et al, Kornuth et al and Keltner et al found antibodies to normal retina in serum of cancer patients with associated retinopathies.<sup>1,3</sup> One key autoantigen was identified as a 23 kD photoreceptor component “recoverin,” later found to be expressed by small cell carcinomas. Other CAR antigens have also since been identified.<sup>3,4</sup> Corticosteroids, gamma globulin, and plasmapheresis do help in some cases.<sup>1</sup>

Induction of autoimmune reactions within the eye by extraocular diseases brings into question the possibility of a sensitisation involving the *M bovis* component of the BCG vaccine. The live attenuated mycobacterium of intravesical BCG infects normal and cancerous

bladder epithelial cells. The infection then initiates a cascade of immune events including a rapid influx of CD4+ T cells, cytokine release (IL2, IFN-gamma and alpha) with an increase of gamma/delta T cells. These cells are not MHC type II restricted.<sup>5</sup> We propose this is how activation of cellular immunity may lead to autoimmune phenomena in the eye.

Our case demonstrated the clinical features of an autoimmune retinopathy but the reaction to CAR antigen was absent. However, the unusual reaction reported suggests the presence of an immune mechanism which has the potential to cause a progressive type of retinopathy, the prognosis of which is unknown and which does not respond to steroids.

We may not have presented enough evidence to link the use of intravesical BCG with the ocular changes, although the temporal relation to the BCG therapy suggests that BCG is the most likely trigger of the autoimmunity. We suggest the bladder neoplasm is also a possibility. Ophthalmologists need to be aware of this rare possibility in order to improve their diagnostic yield in investigations of patients with similar clinical profiles. Patients also need to be warned of this rare but serious complication. This ocular complication in a previously normal patient necessitates regular ophthalmic screening in potential patients.

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## MAILBOX

### Preoperative videotape sessions and patient satisfaction with cataract surgery

We read with interest the article by Pager.<sup>1</sup> The study showed that a preoperative videotape session describing the experience of day

stay cataract surgery resulted in a significant increase in overall satisfaction during the immediate postoperative period.

Patient satisfaction has drawn increasing attentions in all field of medicine for medical, financial, and litigation reasons. Age, types of aphakic correction, information received by patients, ocular co-morbidity, and postoperative visual acuity have been identified as important factors affecting the overall satisfaction in patients undergoing cataract surgery.<sup>2</sup> While this study addressed the psychosomatic response in the perioperative period, it would be interesting to know how the videotape session can affect the perception of surgical outcome. It would be even more worthwhile to assess how such a videotape session can modify the patient response to unfavourable outcomes when surgical complications occur. Further information on patient satisfaction in either group during the follow up period would be relevant.

It was shown that the majority of patients could not recall relevant information after verbal consent.<sup>3</sup> Remembering the information deteriorated significantly after the operation, even more so in those of an advanced age and with less than high school education.<sup>3</sup> Videotape has been used in the informed consent process in other medical fields. Patients having gastrointestinal endoscopy were found to be more satisfied with videotape followed by physician discussion than either method alone.<sup>4</sup> It has also been demonstrated to lead to higher knowledge scores, especially in patients with lower education levels.<sup>5</sup> Since cataract patients are usually old and come with very high expectations, we think that further research is required to explore the use of videotape in order to achieve a better informed consent.

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### Optical coherence tomography in photodynamic therapy

Sahni *et al* presented a new terminology to validate the reliability of optical coherence tomography (OCT) and studied the effect of

photodynamic therapy (PDT) in patients with subfoveal, predominantly classic choroidal neovascularisation (CNV) secondary to age related macular degeneration (AMD).<sup>1</sup> The new terminology introduced neuroretinal foveal thickness (NFT), bilaminar foveal thickness (BFT), outer high reflectivity band thickness (OHRBT), intraretinal fluid (IRF), subretinal fluid (SRF), and vitreomacular hyaloid attachment. A heterogeneous group of patients were included. Whereas in three patients OCT scanning was performed before PDT, 53 had already undergone up to seven treatment sessions. The results showed a significant correlation of mean neuroretinal foveal thickness and intraretinal fluid. Additionally, there was a high correlation between bilaminar foveal thickness and visual acuity (VA). The authors also reported a poor agreement between OCT and clinical examination in the detection of cystoid macular oedema (CMO) and subretinal fluid, indicating the usefulness of OCT.

We congratulate the authors and want to add two aspects from our clinical experience. In a previous study we reported the presence of CMO and increased foveal thickness to correlate with a poorer visual outcome in non-treated neovascular AMD.<sup>2</sup> Sahni *et al* demonstrated no correlation between VA and IRF and SRF in patients undergoing PDT, giving evidence that a beneficial effect of PDT, especially for the group with exudative AMD associated with CMO, arises. OCT seems to be valuable in predicting functional outcome following PDT.

The current study presented no data on the actual time when the OCT evaluation has been performed, although several authors described remarkable OCT findings following PDT. In a prospective study we evaluated 24 patients (53 PDT sessions) before PDT as well as 2 days and 1 week after PDT by VA and OCT.<sup>3</sup> Here, a transient hyperopic shift corresponded with a consecutive increased retinal thickness up to 680 µm on OCT. The cross sectional OCT scan in the macular area revealed a retinal detachment, whereas the anatomy of the neurosensory retina maintained intact, no relevant thickening or schisis-like changes were observed. Previous examinations by Costa *et al*, determined a few hours after PDT, indicated an increased subretinal leakage on indocyanine green angiography (ICG) and consecutive retinal elevation on OCT, confirming our functional and OCT findings.<sup>4</sup> Long term OCT findings presented by Rogers *et al* demonstrated structural alterations in terms of persistent retinal thinning 3 months after PDT.<sup>5</sup> Therefore, OCT findings before the first PDT are necessary to determine predictable signs for functional outcome. OCT is a useful technique describing morphological findings of the retina and choroid. Nevertheless, a higher number of patients before the first PDT application have to be evaluated by OCT to define predictable signs elucidating visual outcome.

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## Optical coherence tomography of the vitreomacular interface in photodynamic therapy

We would like to comment on the excellent article by Sahni *et al*.<sup>1</sup> In their paper, a number of descriptive terms for optical coherence tomography (OCT) analysis are defined in patients with age related macular degeneration (AMD) with subfoveal choroidal neovascularisation undergoing treatment with photodynamic therapy. One term, “vitreomacular hyaloid attachment (VMHA),” was used to refer to incomplete separation of the posterior hyaloid with attachment at the macula. Twenty of 56 patients (35.7%) included in the study had VMHA on OCT. We would like to point out that this vitreomacular configuration is identical to that described in a previous report of normal eyes.<sup>2</sup>

The study by Uchino *et al* reported OCT findings at the vitreoretinal interface in 209 normal eyes. In their study, they defined five individual stages of posterior vitreous detachment (PVD). Two stages represented partial PVD with persistent macular attachment, identical to VMHA as defined by Sahni *et al*. Stage 1 was defined as focal perifoveal PVD in one to three quadrants with persistent vitreofoveal attachment, and stage 2 was defined as perifoveal PVD in all four quadrants with persistent vitreofoveal attachment. Of the 209 normal eyes, 47.8% had stage 1 PVD and 12.6% had stage 2 PVD. Mean age of the patients in the study was 52.3 years (range 31–74 years).<sup>2</sup>

We find it interesting that the percentage of AMD patients with VMHA in the Sahni

study is less than the percentage of normal eyes with stage 1 or 2 PVD in the Uchino study.<sup>1,2</sup> This suggests that the vitreomacular configuration defined as VMHA by Sahni *et al* is probably not a finding specific to the AMD patients included in the study.

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## Author's reply

We thank Mennel *et al* and Duker and Witkin for their interesting comments regarding our article.

Mennel *et al* make some interesting points on the immediate structural changes that occur after photodynamic therapy (PDT), a topic that we thought was outside the scope of our study. I agree that the short term and long term changes after treatment are important and need to be taken into account in future studies on patients undergoing PDT.

We are grateful to Duker and Witkin for pointing out the article by Uchino and colleagues.<sup>1</sup> Our patients were older (mean 76 years (range 59–94)) than those reported by these authors (mean 52.3 years). Uchino *et al* had 20 patients in the same age group and only two patients were above 70 years of age. Both these had a complete posterior vitreous detachment (PVD). All our patients had associated pathology and the majority had undergone PDT, all of which may have influenced the outcome. While the finding of vitreomacular attachment may be more common in normal eyes (>50%), our study<sup>2</sup> suggests that the incidence may be lower in patients with exudative age related macular degeneration (35.7%).

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## NOTICES

### EVER 2005 meeting

This will take place on 5–8 October 2005 in Vilamoura, Portugal. For further details please contact: Christy Lacroix, EVER Secretary, Kapucijenenover 33, B-3000 Leuven, Belgium (tel: +32 (0)16 233 849; fax +32 (0)16 234 097; email:ever@skynet.be).

### World Ophthalmology Congress 2006 – Brazil

The World Ophthalmology Congress (which is replacing the International Congress of Ophthalmology) is meeting in February 2006 in Brazil.

For further information on the congress and committees, scientific program and coordinators of different areas are available at the congress website [www.ophthalmology2006.com.br](http://www.ophthalmology2006.com.br)

### Red eye

The latest issue of *Community Eye Health* (No 53) discusses the role of primary care in the treatment of red eye. For further information please contact: Journal of Community Eye Health, International Resource Centre, International Centre for Eye Health, Department of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, Keppel Street, London WC1E 7HT, UK (tel: +44 (0)20 7612 7964; email: Anita.Shah@lshtm.ac.uk; online edition: [www.jceh.co.uk](http://www.jceh.co.uk)). Annual subscription (4 issues) UK £28/US\$45. Free to developing country applicants.