LETTERS

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Orbital varices and orbital wall defects

Orbital varices are a vascular hamartoma typified by a plexus of low pressure, low flow, thin walled and distensible vessels that intermingle with the normal orbital vessels.\(^1\)\(^-\)\(^4\) If freely communicating with the orbital circulation, engorgement of varices can occur by increasing venous pressure through the Valsalva manoeuvre,\(^5\) bending posture,\(^6\) coughing or straining and these, in turn, lead to the clinical characteristics of variable proptosis, intermittent pain, and orbital haemorrhage.\(^7\)\(^8\)

Observation is usually warranted for small lesions, but surgical intervention may be necessary in advanced cases: indications for surgical intervention include non-resolving episodes of thrombosis, severe disfiguring proptosis or displacement of the globe, and optic nerve compression.\(^9\)\(^-\)\(^10\) Surgery can be extremely difficult, as varices are very friable and intimately intermixed with normal orbital structures; there is also a significant risk of visual loss as a result of haemorrhage or optic nerve damage, the latter being generally caused by vascular compromise.\(^11\)\(^-\)\(^12\) The association of orbital venous anomalies with orbital wall defects provides a further source of surgical difficulty because of the close proximity of intracranial structures and the continuity with extraorbital or intracranial venous anomalies.

Case series

The orbital database, at Moorfields Eye Hospital, was used to identify patients with a clinical diagnosis of low pressure orbital varices and their orbital imaging (computed tomography and/or magnetic resonance image) was reviewed. Images were examined for evidence of orbital expansion, osseous defects of the orbit, nose or sinuses, and anomalies of the frontal lobes. Patients who had either orbital or intracranial surgery before the date of imaging were excluded from the investigation.

The clinical diagnosis of orbital varices was identified in 310 patients, and imaging was available for 223 patients (72%). Six patients with previous orbital or intracranial surgery were excluded and nine cases (4%) had associated anomalies of the neighbouring orbital walls (table 1).

Four cases (patients 1–4) were associated with “pitting” of the orbital wall secondary to orbital varices (fig 1A). Another three cases (patients 6–8) were associated with enlarged superior orbital fissure and two cases (patients 5 and 9) with multiple orbital roof “defects” (fig 1B). Orbital varices were present up to the dural space in two cases (patients 4 and 5), and involved the frontal lobe parenchyma in one case (patient 6; fig 1C, D).

![Figure 1](http://bjo.bmj.com)
Comment

One patient (case 2) had thinning of the superonasal quadrant of the orbital wall, nasal orbital wall pitting, and a low ipsilateral cribiform plate, when first seen at age 21 in 1981 (fig 1E, F). On repeat imaging 20 years later (2001), this patient was noted to have developed proptosis, a defect in the superonasal wall of the orbit, and a new mid-line nasal encephalocoele (fig 1J, L).

Case reports

Patient 1

A 75 year old man was referred with a 10 year history of a conjunctival mass of the left eye with visual acuity of hand movement.

Exenteration of invasive conjunctival squamous cell carcinoma

Ocular surface squamous neoplasia (OSSN) includes conjunctival intraepithelial neoplasia with dysplasia, carcinoma in situ and conjunctival squamous cell carcinoma (SCC). Beside ultraviolet B irradiation identified as an risk factor, OSSN is associated with human papillomavirus type 16 and 18 (HPV-16, HPV-18). The exact role and possible prognostic value of p53 overexpression is unclear and little is known about its expression during the development of conjunctival SCC.

Table 1

Characteristics of nine patients with orbital wall defects in association with orbital varices

<table>
<thead>
<tr>
<th>No</th>
<th>Side</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Main location of orbital varix</th>
<th>Expansion of orbit</th>
<th>Absent walls</th>
<th>Ethmoid</th>
<th>Cribriform</th>
<th>Fronto</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Left</td>
<td>6 M</td>
<td>Medical and extensive superomedia</td>
<td>Present</td>
<td>Small roof defect</td>
<td>Pitted bone and smaller ethmoid</td>
<td>L-low R-normal</td>
<td>Dips low at cribiform</td>
<td>Low frontal lobe over cribiform</td>
</tr>
<tr>
<td>2</td>
<td>Right</td>
<td>21 F</td>
<td>Extracranal-medial</td>
<td>Present</td>
<td>Tiny thin area SQN</td>
<td>Pitted bone and smaller ethmoid</td>
<td>Compressed</td>
<td>Normal</td>
<td>Varices up to frontal lobe</td>
</tr>
<tr>
<td>3</td>
<td>Left</td>
<td>62 M</td>
<td>Superomedia</td>
<td>Present</td>
<td>Pitted roof and small defects of veins</td>
<td>Normal</td>
<td>Normal</td>
<td>Varices up to frontal lobe</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Right</td>
<td>58 F</td>
<td>Panorbit intraconal and extracranal</td>
<td>Present</td>
<td>Post superior wall and pitted bone</td>
<td>Normal</td>
<td>Normal</td>
<td>Varices to orbital lobe</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Right</td>
<td>47 M</td>
<td>Panorbit intraconal and superomedial</td>
<td>Present</td>
<td>Posterior orbital roof</td>
<td>Normal</td>
<td>Normal</td>
<td>Varices up to dural space</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Right</td>
<td>14 F</td>
<td>Posterior intraconal</td>
<td>Present</td>
<td>Enlarged SOF</td>
<td>Normal</td>
<td>Normal</td>
<td>Varices into frontal lobe</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Left</td>
<td>40 F</td>
<td>Posterior intracranal</td>
<td>Present</td>
<td>Enlarged SOF and small lateral wall</td>
<td>Slightly smaller</td>
<td>Unknown</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Left</td>
<td>37 F</td>
<td>Posterior intracranal and extracranal</td>
<td>Present</td>
<td>Very enlarged SOF</td>
<td>Normal</td>
<td>Normal</td>
<td>Varices up to dural space</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Left</td>
<td>6 M</td>
<td>Extracranal—superior (large)</td>
<td>Present</td>
<td>Posterior orbital roof</td>
<td>Normal</td>
<td>Normal</td>
<td>Varices to orbital lobe</td>
<td></td>
</tr>
</tbody>
</table>

SQN = superonasal quadrant; SOF = superior orbital fissure.

Previous biopsies had revealed conjunctival dysplasia. On examination, the tumour of the ocular and tarsal conjunctiva of the lower lid covered the entire corneal surface (fig 1A).

Patient 2

A 90 year old patient presented with a 2 year history of an extensive conjunctival papillomatous tumour of the left eye covering three quarters of the cornea with visual acuity of light perception. A full thickness biopsy was performed.

Both patients underwent orbital exenteration including removal of the eyelids. Histopathologically the focal invasive, completely removed tumour of patient 1 grew in a papillomatous manner. The tumour cells of the conjunctival neoplasm showed strongly enlarged nuclei with prominent nucleoli, and formed cohesive units with intercellular bridges (fig 1B).

The exophytic tumour of patient 2 was predominantly intraepithelial with foci of subepithelial invasion. Focal tumour anaplasia was observed in the otherwise moderately differentiated tumour with squamous cell differentiation.

Immunostaining of both specimens revealed strong p53 (monoclonal mouse-antihuman p53-protein DO-7, Dako) overexpression (>26% of epithelium cells) and low expression of p21 (<6% of epithelium cells) of the invasive region of the tumour indicating an inactivating p53 mutation (fig 1C). While in patient 1 expression for p53 was found in all epithelial layers, in patient 2 it was expressed suprabasally. In contrast, both p53 and p21 showed moderate reactivity in the dysplastic region up to the middle layer of the tumour (fig 1D). In the apical layer epithelium cells were occasionally p21 positive.

Immunostaining for HPV (HPV screening antibody, Virofem Diagnostica, Germany) was positive in patient 1.

Comment

The high recurrence rate of OSSN of 9–64% after resection seems to depend on the histopathological grade and status of surgical margins. HPV-16 and HPV-18 are considered

References

to be possible cofactors involved in initiation and early progression of OSSN. Though both of the presented tumours were clinically papillomatous, immunostaining for HPV was positive only in patient 1. The tumour suppressor gene p53 has been found to be inactivated in over 50% of human cancers. In OSSN, overexpression of p53 has been previously reported in some SCC of conjunctiva. In the SCC of our patients, p53 overexpression indicating inactivating p53 mutations were observed only in the invasive part of the tumour, but not in the carcinoma in situ. While Dushku and coworkers assumed that p53 mutations could be an early event in tumour development consistent with ultraviolet radiation, our findings clearly indicate that mutations of p53 are a late event that occur with disease progression, as observed with other solid tumours. Karcigoğlu and associates found a correlation between p53 overexpression and unfavourable clinical course. In contrast, Aoki and colleagues found no expression for p53 in SCC but positive staining in dysplasia. Our results of two exenterated advanced stages of SCC emphasise the necessity to remove dysplastic OSSN completely to prevent progression to invasive carcinomas. Identification of inactivating p53 mutations may indicate an increased risk for invasiveness. Therefore immunohistochemical analysis of biopsy specimen may help in the management of these tumours.

Figure 1 Patient 1. (A) Extensive papillomatous tumour, subtotally covering the corneal surface of the left eye. Nodular thickening of the lower eyelid indicates eyelid involvement. (B) Histological appearance. Papillomatous pattern of the large epithelial lesion with focal invasion above the cornea. Subepithelially, inflammatory cells and some dilated vessels (haematoxylin and eosin, original magnification, ×2.5). (C) p53, showing strong diffuse reactivity in invasive region indicating an inactivating p53 mutation (original magnification, ×10). (D) p53, showing moderate expression predominantly in the suprabasal layers in dysplastic conjunctiva of the same specimen (original magnification, ×10).

References

Familial pseudotumoral sclerochoroidal calcification associated with chondrocalcinosis

Sclerochoroidal calcification is the deposition of calcium at the level of the sclera and choroid. Two entities have been described: metastatic calcifications resulting from deposition of calcium in normal tissues caused by phosphocalcic metabolism abnormality such as primary and secondary hyperparathyroidism, pseudohyperparathyroidism, hypervitaminosis D, vitamin D intoxication, hypophosphataemia, sarcoidosis, Barter syndrome, and Gitelman syndrome; and dystrophic calcifications caused by secondary deposition of calcium in abnormal tissues despite normal serum levels of calcium and phosphate.

Sclerochoroidal calcifications can also be idiopathic. We describe the first case of hereditary form of sclerochoroidal calcifications associated with familial articular chondrocalcinosis.

Case report

A 69 year old man was admitted to the department of ophthalmology in November 1999 with gradual deterioration of vision in both eyes. He had a medical history of familial articular chondrocalcinosis. His father, brother, and son were treated for the same disease.

On examination, best corrected visual acuity was 20/120 in the right eye and finger counting in the left eye. Slit lamp examination and ocular tension were normal. The funduscopy revealed multiple bilateral pseudotumoral white choroidal masses in both eyes. He had an extensive metabolic evaluation but no cause for chondrocalcinosis could be identified.

On fluorescein angiography in March 1979 dotumoral white choroidal masses in both eyes were visualised. On examination, best corrected visual acuity was 20/120 in both eyes.
The brother’s funduscopy revealed multiple bilateral, extrafoveal pseudotumoral white choroidal masses (fig 2, top). The son’s funduscopy revealed plaque-like and only slightly elevated lesions seen in the mid-periphery (fig 2, bottom). Ultrasonograms confirmed the calcific nature of these lesions.

Comment

In 1997, Shields et al described a case of sclerochoroidal calcifications in a normocalcaemic patient who had chondrocalcinosis. We first describe a familial case of sclerochoroidal calcifications associated with calcium pyrophosphate dihydrate (CPPD). In this family, autosomal dominant inheritance is highly likely because there are affected individuals in each generation, there is male to male transmission, and every affected member has an affected parent. Inheritance in sclerochoroidal calcifications has never been described; however, hereditary forms of chondrocalcinosis have already been described.

In our report, a patient had a 24 year follow up showing a progressive involvement of the macular area, suggesting a growth of the calcifications. Two types of calcifications have been described previously, the plaque-like and the pseudotumoral type.

To our knowledge, it has never been determined if the plaque-like lesions evolve into tumour-like lesions. In 1992, Schachat and associates reported 10 cases with follow up ranging from 7 months to 10 years, for whom no change in the lesion was seen. This is the first observation with 24 years of follow up suggesting a possible evolution of plaque-like lesions to pseudotumoral lesions.

We suggest that every patient affected by familial chondrocalcinosis should have an ophthalmic examination to detect sclerochoroidal calcifications. These lesions seem to be evolving in time with possible involvement of the macula. Choroidal neovascularisation is also a vision threatening complication of sclerochoroidal calcifications. Our case suggest the need to perform ophthalmological examination in patients and family members of patients affected by chondrocalcinosis.

Whole body PET/CT imaging for detection of metastatic choroidal melanoma

Metastatic choroidal melanoma typically presents in the liver. Therefore, liver enzyme assays are the most common haematological evaluation performed after treatment.

In 1985, The Collaborative Ocular Melanoma Study required periodic medical evaluations including a physical examination, liver functions studies, a complete blood count, and a chest x ray. If liver enzymes exceeded 1.5 times normal, computed tomography (CT) of the abdomen was required. If low attenuation hepatic nodules suggested metastatic disease, fine needle aspiration biopsy of the liver tumours provided cytological confirmation.

Positon emission tomography (PET) is a molecular imaging technique that uses radiolabelled molecules to image metabolic activity in vivo. When whole body PET was combined with computed radiographic tomography (CT), PET/CT put anatomy and function on the same page making practical a new era of physiological imaging.

This study examines the ability of positron emission tomography combined with computed tomography (PET/CT) to allow for detection of previously occult metastatic melanoma.

Case report

A 77 year old woman presented with a 15.4 x 15 mm width and 13.2 mm high collar button shaped choroidal melanoma with a large secondary retinal detachment in her right eye. Her preoperative medical evaluation...
(including CT imaging of the abdomen) proved negative. She was treated by enucleation.

Two years later a follow up medical evaluation revealed elevated liver function studies (table 1) and a chest x-ray showed a pleural effusion. CT of the abdomen with contrast revealed multiple low attenuation hepatic foci consistent with metastatic melanoma.

A PET/CT was requested. Fifty minutes after intravenous administration of 15.2 mCi of fluordeoxyglucose, whole body PET/CT imaging revealed enlarged para-aortic lymph nodes and a subcutaneous nodule in the abdominal wall (fig 1). The CT portion of the PET/CT also revealed two 3 mm nodules in the right upper lobe. Right pleural effusion was noted. Both CT and PET showed a large liver metastasis, but CT was better at defining tumour size.

PET imaging was able to reveal multiple bony metastases that were not seen on the CT portion (fig 1). PET imaging also demonstrated the metabolic activity of the metastatic tumours (fig 1).

Comment
In this case, whole body PET/CT was found to be capable of uncovering metastases not seen with abdominal CT alone. This led us away from considering regional perfusion of the liver, hepatic resection, and towards systemic treatment.

A PET/CT was identified as having a significant impact on the management of patients with metastatic choroidal melanoma.

PET/CT could also be used for initial staging. Early detection of occult metastases

### Table 1 Patient characteristics

<table>
<thead>
<tr>
<th>Physical</th>
<th>Examination</th>
<th>Blood examination</th>
<th>X ray</th>
<th>CT scan abdomen with contrast</th>
<th>Whole body PET/CT</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Icterus</td>
<td>High bilirubin, AST, ALT, alkaline phosphatase, GGT</td>
<td>No lesions noted</td>
<td>Hypermetabolic focus in the subcutaneous tissue of the anterior abdominal wall</td>
<td></td>
</tr>
<tr>
<td>Subcutaneous tissue</td>
<td>2 nodules in the anterior abdominal wall</td>
<td>Low attenuation lesion &gt;20 cm in greatest diameter in the right lobe with calcification seen posteriorly. Numerous low attenuation lesions throughout both lobes of the liver.</td>
<td>Hypermetabolic focus in the upper abdomen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nodes</td>
<td>None</td>
<td>Pleural effusion of right lung base and calcified hilar nodes</td>
<td>No lesions noted</td>
<td>Pleural effusion of right lung base and calcified hilar nodes</td>
<td></td>
</tr>
<tr>
<td>Lungs</td>
<td>No abnormalities noted</td>
<td>PLEURAL EFFUSION OF RIGHT LUNG BASE AND CALCIFIED HILAR NODES</td>
<td>Two small 3 mm nodules in the right upper lobe. Right pleural effusion</td>
<td>No foci noted</td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td>Enlarged</td>
<td>Enlarged. 2 areas of low attenuation in the anterior aspect of the right lobe</td>
<td>Low attenuation lesion &gt;20 cm in greatest diameter in the right lobe with calcification seen posteriorly. Numerous low attenuation lesions throughout both lobes of the liver</td>
<td>Enlarged. Large hypermetabolic focus in the right lobe with mass effect. Numerous hypermetabolic foci throughout remainder of liver</td>
<td></td>
</tr>
<tr>
<td>Kidney</td>
<td>8 mm cyst midpole and 2 cm cyst upper pole of left kidney</td>
<td>Large right renal cyst. Additional smaller cysts</td>
<td>Photopenic defect due to large right renal cyst</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bone</td>
<td>No lesions noted</td>
<td>No lesions noted</td>
<td>Hypermetabolic foci in the right skull base, left scapula, left humerus, sternum, multiple bilateral ribs, thoracic and lumbar vertebral spine, pelvis, and bilateral femurs</td>
<td>No lesions noted</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1 On the left, the CT demonstrates the anatomy; on the right the PET shows areas of hypermetabolism (glucose uptake); in the middle the two images are fused. PET/CT revealed enlarged para-aortic lymph nodes and a subcutaneous nodule in the anterior abdominal wall. The PET imaging portion of the PET/CT was able to reveal multiple bony metastases that were not seen on the CT portion of the examination. Both CT and PET showed a large liver metastasis.
offers the potential to avoid ineffective and expensive enucleations, radioactive plaques, proton irradiation, eye wall resections, or laser treatment. Local therapies would be abandoned in favour of systemic treatments.

Another issue related to PET/CT is cost. Up to five times more than CT of the abdomen, PET/CT is only covered (Medicare) for melanoma staging/restaging when the stage of the cancer remains in doubt after completion of conventional imaging (or if the clinical management would differ depending on the PET findings). Since PET/CT revealed extrahepatic foci in this case, it changed our clinical approach. There is little doubt about the improved ability of PET/CT to detect lesions; the real issue is cost and if the results will change outcomes.

This study goes one step further than CT, MRI, or PET alone. By combining whole body PET and CT, this examination joins anatomy and function in one examination (fig 1). The relative efficacy of PET/CT to locate metastases should be evaluated within the framework of a prospective study.

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References

Trans-Tenon’s retrobulbar triamcinolone infusion for small choroidal neovascularisation

Intravitreal and sub-Tenon’s corticosteroids are being evaluated for the treatment of choroidal neovascularisation (CNV).11 We reported on the efficacy of triamcinolone acetonide administered as a trans-Tenon’s retrobulbar infusion (triamcinolone infusion) in reducing inflammation in uveitic eyes.4 Here we evaluated the same treatment in eyes with small subfoveal CNV.

Case reports

Trianacnilone infusion was performed in 22 eyes of 22 patients with subfoveal CNV of greatest diameter less than or equal to 1 disc diameter (DD). The diagnoses were age related macular degeneration (AMD) in 14 eyes, idiopathic CNV in four eyes, polypoidal choroidal vasculopathy (PCV) in three eyes, and punctate inner choroidopathy (PIC) in one eye. One AMD eye had undergone ablative argon laser photocoagulation for CNV previously, but no other eyes had received previous treatment. The median post-triamcinolone infusion follow up was 7.5 months (range 4–27 months).

Pretreatment fluorescein angiography (FA) revealed predominantly classic CNV in 12 eyes and predominantly occult CNV in 10 eyes. Records were reviewed retrospectively and did not require institutional review board approval. Informed consent was obtained before each procedure.

The patient’s eye was prepared with povidone-iodine and sterile drapes applied. After topical anaesthesia, conjunctiva and Tenon’s capsule were incised in the inferotemporal quadrant. A 23 gauge curved blunt cannula approximately 2.1 cm in length (#HS-2764, Handaya Co, Ltd, Tokyo, Japan) was inserted to the hub into sub-Tenon’s space and 20 mg (0.5 ml) triamcinolone acetonide (Bristol Pharmaceutical, KK, Tokyo, Japan) was infused. The wound was left unsutured and 0.5% levofloxacin was instilled topically three times a day for 1 week.

Onset of CNV fibrosis was observed in 14 eyes (64%) by 3 months post-triamcinolone infusion (fig 1). Rates of fibrosis were 50% (7/14 eyes) for AMD, 100% (4/4 eyes) for idiopathic CNV, 67% (2/3 eyes) for PCV, and 100% (1/1 eye) for PIC. Fibrosis did not correlate with CNV size or lesion composition. FA performed at 3 months showed decreased leakage in 12 eyes (59%), no change in five eyes (23%), and increased leakage in five eyes (23%). Best corrected visual acuity (VA) at 3 months for all eyes improved by ≥0.2 logarithm of the minimum angle of resolution (logMAR) in four eyes (18%), remained unchanged in 13 eyes (59%), and worsened by ≥0.2 logMAR in five eyes (23%). The median decimal VA for all eyes was 0.30 before treatment (range 0.08–1.0) and 0.24 at 3 months after treatment (range 0.05–1.2). Of the 14 eyes with AMD, the VA at 3 months improved by ≥0.2 logMAR in one eye (7%), remained

Figure 1 Colour fundus photographs and fluorescein angiography late images of an eye in a 65 year old patient with age related macular degeneration and small subfoveal choroidal neovascularisation before (A, B; best corrected visual acuity 0.3) and 3 months after triamcinolone infusion (C, D; best corrected visual acuity 0.7).
unchanged in 10 eyes (71%), and worsened by >0.2 logMAR in three eyes (21%). In these AMD eyes, the median decimal VA was 0.30 before treatment (range 0.08–1.0) and 0.20 at 3 months after treatment (range 0.05–0.7). Complications such as intraocular pressure elevation, infection, or cataract progression were not noted in any eyes.

Comment
This interventional case series shows that trans-Tenon’s retrobulbar infusion of triamcinolone acetonide resulted in lesion fibrosis in the majority of eyes with small CNV efficacy being best for idiopathic CNV or CNV related to PIC. The mechanism of action of triamcinolone acetonide in inhibiting CNV growth probably involves several pathways. The effect of corticosteroids in inhibiting inflammatory cells that participate in the neovascular response probably has a prominent role. Triamcinolone acetonide has specifically been shown to inhibit basic fibroblast growth factor induced migration and tube formation of choroidal microvascular endothelial cells. Furthermore, triamcinolone acetonide inhibits choroidal neovascularisation induced by laser trauma in a rat model. Finally, triamcinolone acetonide may decrease vascular permeability, thereby decreasing influx of serum proteins that may contribute to an angiogenic microenvironment. Longer follow up and greater numbers of cases in a randomised clinical trial are needed to confirm these results.

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References

Retinoblastoma in a child conceived by in vitro fertilisation
As the number of infants born through in vitro fertilisation (IVF) grows, there is increased interest regarding the long term effects of IVF and other assisted reproduction techniques on such offspring. Recent reports have noted cancer in children born after IVF or fertility drug use (table 1).

In 2001, retinoblastoma was reported to occur in a child born through IVF in Israel. Since then, an additional report documented four cases from the Netherlands. Here we add a sixth case and the first from the United States. Of these children four had unilateral retinoblastoma and two bilateral disease (table 2).

During 2002, a 16 month old child was referred to The New York Eye Cancer Center with no known family history of eye disease. She had a blind painful right eye with neovascular glaucoma. Intraocular pressures were 35 mm Hg in the right eye, and 14 in the left. Examination of the anterior chamber of the right eye revealed cells on the corneal endothelium and iris neovascularisation. While ophthalmoscopic examination of the right eye was not possible because of opaque media, ultrasonography revealed a densely calcified mass in the posterior pole (fig 1). Computed radiographic tomography demonstrated tumour calcification with no evidence of extrascleral or optic nerve extension. Post-enucleation histopathology confirmed the diagnosis of retinoblastoma. The parents did not approve genetic studies of the child.

Further history revealed that this child was born through IVF with a donor egg and the father’s sperm. In order to carry the child, the postmenopausal mother received oestrogen and progesterone before and during gestation.

Comment
Several theories of IVF related carcinogenesis exist. Prenatal exposure to fertility drugs may initiate cancer in the embryo or parental effect. The mechanism of action of fertility drugs is not definitively established.

Table 1 Anomalies and cancers reported in offspring of IVF

<table>
<thead>
<tr>
<th>Condition</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurospermic tumours</td>
<td>White et al 1</td>
</tr>
<tr>
<td>Neuroblastoma</td>
<td>Kramer et al 2</td>
</tr>
<tr>
<td>(Note: associated with the use of fertility drugs only)</td>
<td>Michalek et al 3</td>
</tr>
<tr>
<td>Retinoblastoma</td>
<td>Moll et al 4</td>
</tr>
<tr>
<td>Hepatoblastoma</td>
<td>Malamed et al 5</td>
</tr>
<tr>
<td>Clear cell kidney sarcoma</td>
<td>Toren et al 6</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>Kobayashi et al 7</td>
</tr>
<tr>
<td>Transposition of the great arteries</td>
<td>Berg et al 8</td>
</tr>
<tr>
<td>Neural tube defects</td>
<td>Lancaster 9</td>
</tr>
</tbody>
</table>

Several types of congenital anomalies and cancers have been reported in the literature, primarily in the form of case reports. The relation between IVF and these conditions is not definitively established.

Table 2 Retinoblastoma in children born through IVF

<table>
<thead>
<tr>
<th>Reference</th>
<th>Sex and age at diagnosis</th>
<th>Eye</th>
<th>Cause of subtherapy</th>
<th>DNA 13q14 analysis</th>
<th>Assisted reproductive technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anteby et al</td>
<td>NR, 30</td>
<td>Unilateral</td>
<td>NR</td>
<td>NR</td>
<td>IVF with donor sperm</td>
</tr>
<tr>
<td>Mall et al</td>
<td>M, 15</td>
<td>Left</td>
<td>Maternal cause</td>
<td>Normal</td>
<td>IVF</td>
</tr>
<tr>
<td>Mall et al</td>
<td>M, 8.5</td>
<td>Bath</td>
<td>Unexplained</td>
<td>Intron 3</td>
<td>IVF with 8 AI attempts</td>
</tr>
<tr>
<td>This report</td>
<td>F, 32</td>
<td>Left</td>
<td>Patterning cause</td>
<td>Normal</td>
<td>IVF with ICSI</td>
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NR, not reported; AI, artificial insemination; ICSI, intracytoplasmic sperm injection. Current literature on retinoblastoma in children born through IVF includes three case reports that describe a total of six cases of retinoblastoma in these children. The characteristics of these patients and the patient discussed in this report are listed below.
PostScript 1099

Infertile couples in order to determine if there
up, and prospective randomised studies of
epidemiological studies with long term follow
Therefore, it seems reasonable to maintain a

tumour. R, retina; S, shadow in orbit; C,
detachment. (B) A transverse view of the eye
longitudinal view of the right eye demonstrates
Figure 1
B-scan ultrasonography. (A) A

Reproductive Technology Success Rates
that which appears in the 2000 Assisted
ART success and multiple birth risks (beyond
laboratory resulted in 25 228 live births and
99 629 procedures were performed in 2000 by

Retinoblastoma is the most common
intraocular cancer of childhood and affects
approximately 300 children each year in the
United States. Retinoblastoma is a manifesta-
tion of a de novo deletion or mutation of the
q14 band of chromosome 13, occurring as
a “second hit” during embryogenesis or the
result of two hit deletions in retinal cells.
In that it could be the result of chromosomal
breakage and deletions in IVF born children,
surveillance of retinoblastoma incidence in
children born through IVF is warranted.6

With the advent of assisted reproductive
technology (ART) in 1977, American couples
have increasingly turned to such treatments
to overcome fertility problems. Nationwide,
99 629 procedures were performed in 2000 by
ART. In that year, fertility treatments in which
the egg and sperm are handled in the
laboratory resulted in 25 228 live births and 35
025 infants. This report expands informa-
tion on geography and determinants of both
ART success and multiple birth risks (beyond
that which appears in the 2000 Assisted
Reproductive Technology Success Rates6). Therefore, it seems reasonable to maintain a
registry of post-IVF children, to support large
epidemiological studies with long term follow
up, and prospective randomised studies of
infertile couples in order to determine if there
is a relation between IVF and cancers such as
retinoblastoma.

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Angle closure glaucoma after laser photoagglutination for
retinopathy of prematurity

Infantile angle closure glaucoma (ACG) is a
rare consequence of retinopathy of prema-
turity (ROP) and usually occurs a few years
after laser treatment for ROP.1-3 A Medline
search for ACG following laser photoaggluta-
tion extracted only one case. In the case, ACG
occurred in 2 weeks after laser photoaggluta-
tion and although occurrence of iris bombe in
both eyes was described, the mechanism for the
ACG was not fully clarified.4

We present a case of bilateral ACG that
occurred within a several weeks after the
laser photoagglutination for ROP. We shall
discuss the importance of ultrasound biomicro-
coscopy (UBM) in the diagnosis.

Case report

A baby girl, born at 25 weeks gestation
weighing 796 g, was diagnosed with stage 2
plus, zone 2 ROP bilaterally at 33 weeks.
Diode laser photoagglutination, 986 applica-
tions right eye and 629 left eye, with 200-
240 mW, 0.4 second duration, was performed
by a paediatric ophthalmologist. On the
following day, severe hyphaema was
observed bilaterally but there was no evi-
dence of choroidal detachment by B-mode
ultrasound sonography. Topical atropine
and corticosteroid were started and she was

Figure 1
Photographs of the anterior segment of
left eye (A) and right eye (B) obtained with an
operative microscope after peripheral
iridectomy. The photographs show shallow
anterior chambers and persistent pupillary
membranes and iridohyaloid vessels (A), and
conical opacity (B).

Figure 1
B-scan ultrasonography. (A) A
longitudinal view of the right eye demonstrates a
tumour posterior to a closed funnel retinal
detachment. (B) A transverse view of the eye
demonstrates a rounded, densely calcified
tumour. R, retina; S, shadow in orbit; C,
calcification; T, tumour; ON, optic nerve.

Figure 1
A
B

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followed up conservatively. During the follow up period, total posterior synechia was formed in the both eyes and the anterior chamber became shallow.

At 39 weeks, the corneal diameter had increased, and the anterior chamber was extremely shallow bilaterally. The intraocular pressure (IOP) in the right eye was elevated to 28 mm Hg, and she was referred to our hospital.

Our examination showed that the corneal diameter was increased to 11 mm bilaterally. Slit lamp examination showed corneal oedema and shallow anterior chamber depth bilaterally, especially in the right eye. The corneal oedema made the funduscopic difficulty bilaterally. The IOP under the general anaesthesia was 33 mm Hg right eye and 17 mm Hg left eye. Persistent pupillary membranes and iridohyaloid vessels were observed but ruberosis iridis was not observed (fig 1).

UBM images of anterior segments demonstrated iris bombe bilaterally, and the entire right iris surface was adherent to the corneal endothelium. As a result, the anterior capsule of the lens was also attached to the corneal endothelium (fig 2). Choroidal detachment and a retrolental mass were not observed by B-mode ultrasound sonography (fig 2).

Peripheral iridectomy was performed bilaterally (fig 1). Postoperatively, her peripheral anterior chamber deepened bilaterally although the lens in the right eye was still adherent to the corneal endothelium. Indirect ophthalmoscopy revealed normal cup to disc ratio. The IOP fell to normal levels bilaterally.

Comment
Shallow anterior chambers in ROP patients are known to be caused by various factors—for example, choroidal detachment after excessive photocoagulation, development of retrolental mass, or relative increment in lens thickness, but usually the cause of shallow anterior chamber cannot be determined. In our case, the development of hyphaema after photocoagulation induced posterior synechia, and the iris bombe followed. The displacement of the anterior chamber structures was induced by the forward movement of the iris-lens diaphragm in the right eye, and the ocular fragility in premature baby may explain this deformity.

Vitreous haemorrhage is known to occur in 7.9% of ROP cases after photocoagulation. In our case, there is a possibility that the hyphaema was derived from vitreous haemorrhage. Another possibility is an accidental photocoagulation of persistent pupillary membranes and/or iridocorneal vessels caused the hyphaema. We are not aware of such morphological changes after photocoagulation for ROP.

ACG that occurs immediately after retinal photocoagulation in ROP patients is rare, but is still an important complication. In ROP patients, the lens and its ligament are weak, and therefore not only ACG but also lens displacement occurred. It is important that we be aware of the possible development of ACG following retinal photocoagulation for ROP.

Sequential treatment of central retinal vein occlusion with intravitreal tissue plasminogen activator and intravitreal triamcinolone

Treatment for central retinal vein occlusion (CRVO) remains disappointing despite recently proposed intraocular surgical techniques. We previously introduced the use of intravitreal tissue plasminogen activator (TPA) for acute central retinal vein occlusion in 1999. Numerous investigators have confirmed its safety and suggested that it may have a beneficial role in the treatment of acute central retinal vein occlusion.

Although some studies in rabbits suggest the rabbit retina is not permeable to TPA,
in the course of thrombus formation to be effective. We do not recommend its use for patients with chronic symptoms. Intravitreal steroids appear to decrease the blood-retinal barrier breakdown and macular edema, but recurrent edema may occur since the steroids do not appear to affect the thrombus itself.

Case report
A 59 year old obese, hypertensive flight instructor presented with a sudden decrease in vision for 7 days in the right eye. Vision was 20/400 right eye and 20/20 left eye. The patient was diagnosed with an acute CRVO in the right eye (fig 1A). The left eye was normal. After being advised of the risks and benefits, the patient elected to undergo intravitreal injection of TPA (75 µg). Thirteen days later, the patient noted marked improvement in vision with 20/20 vision. Thirty four days after the injection, the patient's vision was 20/30 (Fig 1B).

Six months after intravitreal TPA injection, the vision remained 20/30, but the patient still complained of metamorphopsia and blurry vision despite resolution of other findings of CRVO (fig 1C). Fluorescein angiogram (FA) revealed persistent macular edema (fig 2A). Optical coherence tomography (OCT) showed the foveal thickness to be 331 m with mild intraretinal edema. After being advised of the risks and the benefits, the patient then underwent injection of intravitreal triamcinolone (4 mg).

Severe post-laser suprachoroidal haemorrhaging in a diabetic patient receiving anticoagulants

Although the aetiology is not well understood, expulsive suprachoroidal haemorrhaging (ESH) is the most severe complication associated with intraocular surgery. Anticoagulants are considered a risk factor for spontaneous suprachoroidal haemorrhaging in cases with high myopia, age related macular degeneration, and diabetic retinopathy. However, ESH post photocoagulation is extremely rare regardless of anticoagulant therapy. We have experienced a severe case of post-laser ESH correlated with anticoagulant therapy, which resulted in irreversible visual disturbance.

References


Figure 2 (A) Fluorescein angiogram reveals persistent macular oedema and hyperfluorescence 6 months after intravitreal TPA injection. (B) Late frames show resolution of macular oedema 6 weeks after intravitreal triamcinolone.
appreciate for post-cardiac infarction). Presumably, choroidal microbleeding initiated by photoocoagulation persisted because of an overly suppressed coagulation system; blood pooled in the choroidal space, which assumed an ESH. To our knowledge, there is only one other similar case reported by Khairallah *et al.* that showed post-laser choroidal haemorrhage in a diabetic patient treated with anticoagulant. Even though ESH incidence is low, extreme caution must be exercised when performing laser therapy in patients using anticoagulants, because of potentially serious outcomes. An age of 65 years or more, history of stroke, history of gastrointestinal bleeding, a serious morbid condition (recent myocardial infarction, renal insufficiency, or severe anaemia), and atrial fibrillation are five high risk factors for major bleeding in outpatients treated with warfarin. It is possible, preoperative coagulation system examinations are recommended for high risk patients receiving anticoagulant treatments.

Figure 1 A fundus photograph of the patient after laser photoocoagulation. A severe choroidal detachment associated with secondary retinal detachment was found.

Figure 2 The findings of B-mode ultrasound examination. A massive haemorrhage in the choroids is present.

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Authors’ reply

We appreciate the interest and many comments we have received regarding our recent article.1 In reply to the comments by Dr Vedanham, we acknowledge the paucity of experimental data to prove that accurate placement of corticosteroids into the sub-Tenon’s space provides good drug penetration into the eye. However, the studies to the contrary cited by Vedanham have all used needles to make such “accurate placement,” including the study by Jennings *et al.*2 which utilised the technique described by Tessler.3 Use of needles represents not only a potential hazard to the eye in terms of accidental globe penetration, but also makes it much more difficult to place any sub-Tenon’s injection under the posterior Tenon’s capsule near the macula and/or around the optic nerve. It has been shown that many injections for the sub-Tenon’s space merely end up somewhere in the orbit outside of Tenon’s capsule.4 We believe that our method using a 23 gauge blunt, curved, long cannula (the one we used was No HS-2764 by Handaya Co, Ltd, Tokyo, Japan) assures accurate placement into the target space, thereby increasing therapeutic efficacy and obviating the need for globe invasive procedures such as intravitreal injection of corticosteroids, corticosteroid intravitreal implants, and/or therapeutic vitrectomy.

However, we are in agreement with Vedanham, in that ultimately corticosteroid placed outside of the eye may be no match for the efficacy that may be obtained by corticosteroid placed inside the eye. Yet we have found such a high efficacy rate for the transition of the corticosteroid administration, can- not be taken lightly. Furthermore, we believe that the reason why sub-Tenon’s injections of corticosteroids have not become popular among retina specialists who for example treat diabetic macular oedema, is more likely related to the lower efficacy rate when using needles as opposed to the technique using an infusion cannula that we advocate. Lastly, obtaining the infusion cannula seems like a small inconvenience (and an even smaller cost) to the physician compared to the risk of doing intravitreal injections of corticosteroids as a treatment of first choice as advocated by Vedanham. We strongly encourage all uveitis and retina specialists who have up until now been disappointed with the efficacy of their sub-Tenon’s corticosteroid injections, to make the effort to obtain an appropriate cannula and revise their technique before jumping to intravitreal procedures.

In reply to the first comment by Dr Mehta,5 we acknowledge the current WHO guidelines, revised for 2003, that include recommendations for extrapulmonary tuberculosis.6 However, we would also like to amend Mehta’s comment, in that the WHO admits in those guidelines that there are many...
regimens with reported efficacy including a 6 month regimen of rifampicin (with streptomycin also given in the initial phase only) for tubercular uveitis. Furthermore, the WHO recommendations are for active extraocular tuberculosis that has been diagnosed by specimen examination or strong clinical evidence, and give no recommendations for latent infection. As we have previously reported in a series on intraocular tuberculosis, systemic examination failed to identify a focus of active tuberculosis in the majority of our patients, and we have come to suspect that the uveitis we observed may be an immune response to latent tuberculosis antigen sequestered elsewhere. Therefore, the patients we described were given a diagnosis of "presumed intraocular tuberculosis," that is with uveitis presumed to be related to the Mycobacterium tuberculosis organism. Furthermore, we would like to clarify that in the cases of presumed ocular tuberculosis that received trans-Tenon's retrobulbar triamcinolone infusion, this treatment was judged to be effective in two of three eyes. Regardless, since the focus of active or latent tuberculosis was never identified in our patients, a two drug regimen of isoniazid and rifampicin was used as a therapeutic trial for antituberculosis therapy. A similar therapeutic trial for ocular tuberculosis, albeit with isoniazid alone, has been previously advocated in Japan by Ishihara and Ohno. With regard to the second comment, among the 16 patients who were receiving some form of systemic immunosuppressive therapy, we did not notice any difference in outcome when compared to patients who were not on immunosuppressive therapy. In other words, the efficacy of trans-Tenon's retrobulbar triamcinolone infusion was the same. However, we suspect that the recurrence rate after triamcinolone infusion may be different, and we are currently investigating this possibility.

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Owls’ eyes move
"Double crossed," the cover illustration and article by Schwab on the barn owl refers to the alleged immobility of the owl’s eyes. This is a myth which should not be perpetuated in the BJOG. The owl’s eyes do in fact move, while the amount is not large, it is just enough for two papers on the subject. The phrase "nearly immobile" is preferable. M J Steinbach
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Low vision care
The latest issue of Community Eye Health (No 49) deals with the problems and management of low vision. 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@lshm.ac.uk; online edition: www.jceh.co.uk). Annual subscription (4 issues) UK £28/US$45. Free to developing country applicants.

Elimination of avoidable blindness
The 56th World Health Assembly (WHA) considered the report on the elimination of avoidable blindness (doc A56/26) and urged Member States to: (1) Commit themselves to supporting the Global Initiative for the Elimination of Avoidable Blindness by setting up a national Vision 2020 plan by 2005; (2) Establish a national coordinating committee for Vision 2020, or a national blindness prevention committee to help implement the plan; (3) Implement the plan by 2007; (4) Include effective monitoring and evaluation of the plan with the aim of showing a reduction in the magnitude of avoidable blindness by 2010; (5) To support the mobilisation of resources for eliminating avoidable blindness. The WHO also urged the Director-General to maintain and strengthen WHO’s collaboration with Member States and the partners of the Global Initiative for the Elimination of Avoidable Blindness as well as aid in the coordination and support of national capability.

4th International Congress on Autoimmunity
The 4th International Congress on Autoimmunity will take place 3–7 November 2004 in Budapest, Hungary. The deadline for the receipt of abstracts is 20 June 2004. Further details: Kenes International Global Congress Organisers and Association Management Services, 17 Rue du Cendrier, PO Box 1726, CH-1211 Geneva 1, Switzerland (tel: +41 22 908 0488; fax: +41 22 732 2850; email: autoimm04@kenes.com; website: www.kenes.com/autoimm04).

XVI International Congress for Eye Research