Three weeks following the third day case administration of IVIg the patient developed sudden painless loss of vision affecting her right eye. Right-sided disc swelling was noted in conjunction with extensive retinal haemorrhage and cotton wool spots, indicating a diagnosis of CRVO (Fig. 1). Visual acuity was reduced in the right eye to 6/60. Plasma viscosity was not elevated at 1.64 (normal values < 1.70). Serum immunoglobulin profile was normal. Clotting screen and thrombophilia screen including protein C, protein S, antithrombin 3, factor V Leiden and APC resistance were all normal. Anticardiolipin antibody was not detected. Intraocular pressure was normal and following ophthalmological assessment the patient was managed conservatively. IVIg was discontinued and the patient maintained on treatment with prednisolone 15 mg daily and azathioprine 100 mg daily. The patient has subsequently made a full neuro-ophthalmological recovery with visual acuity recorded as 6/5 bilaterally, with no evidence of optic atrophy or afferent pupillary defect at 2 years after the event.

Discussion

Hyperviscosity syndromes have well-recognised associations with CRVO. *In vitro* studies have confirmed a dose-related increase in viscosity with IVIg products and there are a number of documented cases of thrombotic complications associated with the therapeutic use of IVIg. There has been one case in the literature of bilateral CRVO occurring in a 17-year-old man requiring immune replacement therapy following treatment for acute lymphoblastic leukaemia.[2] To date there have been two other cases of visual loss in association with IVIg therapy reported to the Committee on Safety of Medicines. Raised cholesterol greater than 6.2 g/l has also been reported as an independent risk factor for CRVO.[3]

We propose that in this case the therapeutic use of IVIg, possibly combined with the raised cholesterol, may have precipitated the episode of visual loss, although we do acknowledge that it may have been coincidental as a significant percentage of cases of CRVO have no detectable systemic cause. Hyperviscosity does not appear to be the direct cause as the event occurred 3 weeks after the infusion of IVIg and the viscosity was normal. Nitric oxide plays a critical role in vascular homeostasis through the inhibition of platelet aggregation and promoting vasodilatation, and *in vitro* studies have shown that human immunoglobulins are able to downregulate the production of thrombin-induced nitric oxide production in a dose-dependent fashion.[4] *In vivo* studies have shown a correlation between adverse reactions and elevated levels of the proinflammatory cytokine interleukin 6 and the vasoactive substance thromboxane (TXB_2).[5] It is possible that IVIg-induced alterations in the profile of cytokines and vasoactive substances may have precipitated a localised thrombotic occlusion. This case emphasises the importance of screening for vascular risk factors in patients requiring treatment with IVIg.

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Sir,

Pigment dispersion syndrome and butterfly-shaped pattern dystrophy of the retinal pigment epithelium

Pigment dispersion syndrome (PDS) consists of pigment deposition on the corneal endothelium in a vertical spindle pattern (Krukenberg's spindle), in the trabecular meshwork and on the lens periphery.[1] Recent studies have suggested that the retinal pigment epithelium (RPE) may also be involved in PDS.[2–4] We here describe a patient with butterfly-shaped pattern dystrophy of the RPE in addition to PDS.

Case report

A 48-year-old woman presented with metamorphopsia of 3 weeks' duration. Visual acuities were 20/20 right eye and 20/25 left eye. The patient described some parallel wavy lines on the Amsler grid in the left eye. There was no positive family history. Past medical history disclosed hysterectomy for myoma uteri.

Slit-lamp examination revealed pigment deposits on the posterior corneal surface in the form of Krukenberg's spindles bilaterally. Goldmann applanation pressure was 19 mmHg in each eye. Gonioscopy disclosed bilateral open angles with grade 3–4 pigmentation of the trabecular meshwork (Fig. 1). There were no peripheral transillumination defects. After dilatation of the pupils, pigment deposition also on the posterior surface of the lens was noted inferiorly. Funduscopy revealed healthy optic nerve heads with a cup/disc ratio of 0.2. At the macula, butterfly-shaped yellowish flecks were noted in deeper layers of the retina bilaterally (Fig. 2).

Fig. 1. *Trabecular pigmentation, left eye.*

Examination with a Goldmann three-mirror lens disclosed the lesions to be at the level of RPE. The retinal vessels and the periphery appeared normal.

The visual fields were normal on the Humphrey perimeter. No deterioration of the colour vision was noted on the Ishihara (1990 ed.) and Lanthony's 40-Hue tests. The electro-oculogram (EOG) was normal (1.96) for the right eye, but subnormal (1.56) for the left; the electroretinogram (ERG) was normal. Fluorescein angiography revealed hypofluorescence corresponding to the yellowish flecks, surrounded by hyperfluorescence corresponding to the associated pigment epithelial atrophy (Fig. 2). Three subsequent intraocular pressure measurements were less than 21 mmHg bilaterally.

The ocular examinations of her daughters, aged 26 and 30 years, were unremarkable. The parents were not alive, and the siblings were unavailable for examination.

Comment

The RPE has been postulated to be involved in PDS due to associated peripheral chorioretinal changes in some patients.[4,5] Only two clinical observations concerning the posterior pole have previously been reported: pigmentary pattern dystrophy associated with PDS in a young man and widespread degeneration of the RPE associated with pigmentary glaucoma in two brothers.[3,4] These reports suggested a disorder of the pigment epithelium in both anterior and posterior segments of the eye in PDS, in which the mechanical theory of anterior zonular packets rubbing an abnormally convex posterior iris surface[6] may not be applicable. Significant electro-oculographic changes in a group of patients with PDS further confirmed RPE involvement.[2]

This case showed the characteristic features of PDS: pigment deposits on the posterior surface of the cornea and the lens, hyperpigmentation of the trabecular

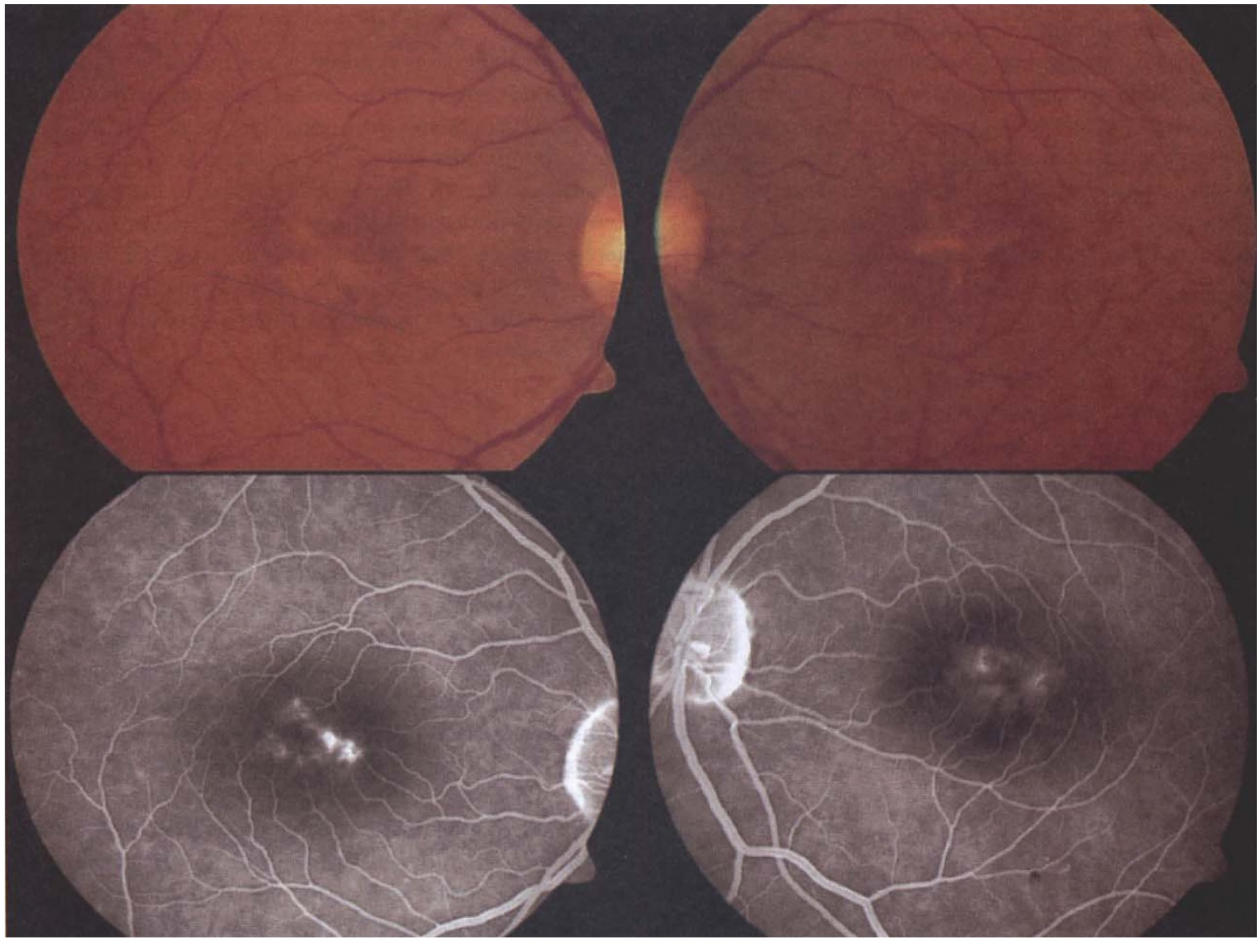

Fig. 2. *Upper left: Yellowish flecks at the level of the retinal pigment epithelium (RPE), right eye. Upper right: Butterfly-shaped yellowish flecks, left eye. Lower left: Fluorescein angiogram showed blockage due to the lesion and hyperfluorescence due to the RPE defect, right eye. Lower right: Fluorescein angiography of the butterfly-shaped RPE dystrophy at the macula, left eye.*

meshwork with normal intraocular pressures, visual fields and optic discs, along with butterfly-shaped dystrophy.

Classically, the butterfly-shaped pattern dystrophy of the RPE is described as a symmetrical bilateral, pigmented, polymorphous (but in most cases butterfly-shaped) lesion seen in the deeper layers of the central macula.[7] Yellowish, not heavily pigmented lesions in the same pattern, as in our patient, are also classified as butterfly-shaped dystrophy.[8] In patients with this kind of dystrophy, vision is usually preserved, the ERG is normal and the EOG is usually reduced, indicating a disturbance in the function of the RPE.[7] In our patient, visual acuity and the EOG were slightly reduced in the symptomatic left eye.

To the best of our knowledge, the association of PDS with butterfly-shaped pattern dystrophy has not been previously reported. This association may be regarded as a coincidence. However, a previously documented association with pigmented pattern dystrophy, presumed to be a different expression of the same pigment epithelial dystrophy,[3] supports their connection. This most probably stems from the neural ectoderm, the common embryological origin of the pigment epithelium of both the iris and the retina.

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Sir,

Null cell lymphoblastic lymphoma of the orbit

Proptosis in children is rare. Prompt diagnosis is important to expedite treatment, prevent loss of ocular function and in some cases prevent death.

This report describes the clinical, radiological and pathological features of orbital null cell lymphoma in a child and highlights the diagnostic difficulties that arose with this extremely rare lymphoma.

Case report

An 8-year-old Asian boy presented with a 6 month history of intermittent painful swelling of his left upper eyelid, a slight ptosis and recent onset of diplopia. There were no previous medical problems.

He had fullness in left superolateral lid, 2 mm left ptosis, 3 mm non-axial proptosis with downward displacement, a just palpable non-tender mass edge in the left superior and superolateral orbit, limitation of elevation of the left eye and temporal fullness (Fig. 1, top). CT and MRI scans showed a homogeneous mass in the superior and superolateral orbit with adjacent minor bony destruction, marrow space obliteration, a mass in the temporalis fossa and no intracranial involvement (Fig. 1, middle). Paraffin sections of an orbital biopsy were reported as showing lymphoid proliferation with atypical features. He was treated with a 6 week course of tapering systemic steroids starting with prednisolone 40 mg a day, which resulted in a marked reduction in the clinical and radiological size of the mass over days.

Two weeks following cessation of steroids the patient developed signs of slowly progressive orbital mass enlargement. Systemic steroids were recommenced with limited effect. Repeat orbital biopsy of the mass revealed a lymphocytic cellular infiltrate. The cells had a positive reaction to common leucocyte antigen CD45 clone 2B11 + PD7/26, some were weakly positive for T CD3, CD43, CD45 RO (UCHL1) and B cell markers CD20 (clone L26), CD79a (clone HM57), but most cells were negative for these lymphoid markers (Fig. 1, bottom). Polymerase chain reaction for T Beta gene rearrangement was no different from normal tonsil.

A diagnosis of lymphoblastic lymphoma of the null cell phenotype was made by a lymphoma panel. Systemic investigation did not reveal systemic lymphoma. Chemotherapy was commenced with the UKCCSG 904 Protocol for Childhood Non-Hodgkin Lymphoma (briefly, induction with vincristine, asparaginase and prednisolone, blocked intensification therapy and three courses of high-dose methotrexate and central nervous system prophylaxis with intrathecal methotrexate). Treatment was given over 2 years.

Chemotherapy brought about a rapid shrinkage in tumour size with resolution of symptoms. The patient remains asymptomatic with no ocular abnormalities to the present, almost 4 years since completion of his chemotherapy.