Benign idiopathic haemorrhagic retinopathy

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CLINICAL STUDY

Abstract

Purpose **To describe a new condition characterised by an unusual unilateral idiopathic haemorrhagic retinopathy.**
Methods **A review is presented of patient histories from 5 patients with acute-onset unilateral idiopathic haemorrhagic retinopathy, including results of ophthalmological, haematological and fluorescein angiographic examinations.**
Results **All patients had an extensive deep blot haemorrhagic retinopathy without significant vascular signs or abnormal optic discs. In 4 cases the haemorrhage was sufficiently severe to break through into the vitreous. Fluorescein angiography demonstrated normal arteriovenous flow, without capillary non-perfusion, vessel or disc leakage. Disc swelling, macular oedema and cotton wool spots were not seen at any stage in these patients. All patients recovered the visual acuity in the affected eye by 4 months. Systemic examination in all cases was unremarkable.**
Conclusion **This distinct and rare form of retinopathy is important to define since it has a good prognosis without treatment.**

Key word Retinal haemorrhage

Retinal haemorrhages are relatively common in ophthalmic practice. The form of the haemorrhage, systemic examination findings and past medical history usually indicate the underlying aetiology. More frequent causes include central and branch vein occlusions, diabetic, hypertensive and venous stasis retinopathies. Rarer entities such as retinal vascular anomalies, Eales disease, traumatic (Purtscher's retinopathy, asphyxia, hydrostatic pressure syndrome) and altitude retinopathies are well described with a quite characteristic appearance or medical history.[1–3]

We describe a series of patients with an acute unilateral haemorrhagic retinopathy. The retinopathy did not fit any recognised category and, importantly, it followed a benign course with complete recovery of visual acuity.

Materials and methods

Five patients who presented to the Bristol Eye Hospital between 1992 and 1998 with an acute haemorrhagic retinopathy are presented. These patients underwent ophthalmic and cardiovascular examinations, followed by fundus fluorescein angiography. Basic haematological investigation of full blood count, erythrocyte sedimentation rate, lipid profile and blood glucose were performed. Additional haematological and radiological investigations were performed on some patients based on the individual histories (see below).

Results and case histories

Case 1

A 57-year-old white woman had sudden painless loss of vision in her right eye. She described a horizontal purple band and grey veil in her superior visual field. Her general practitioner assumed an embolic process and applied digital massage after which the purple band resolved but the grey veil in her superior field persisted. She had no medical or ophthalmic history of note. When seen in the casualty department approximately 1 hour from onset of symptoms her visual acuity was 6/12 corrected in the right eye and 6/9 in the left. Anterior segments and intraocular pressures were normal and there was no relative afferent pupil defect. Fundoscopy showed multiple deep, discrete, scattered, posterior pole retinal haemorrhages and a large preretinal haemorrhage extending inferiorly from the optic disc with some breakthrough into the vitreous (Fig. 1a).

Full blood count, erythrocyte sedimentation rate, urea and electrolytes, liver function tests and glucose were all normal. She had a slightly raised random cholesterol at 7.2 mmol/l. Protein electrophoresis demonstrated a non-specific inflammatory response with a polyclonal increase in gamma-globulins. The autoimmune profile was normal. Fluorescein angiography performed 2 days after the onset of symptoms showed haemorrhages masking the choroidal fluorescence. In areas that were not obscured by haemorrhage the capillary circulation was intact. There was no significant

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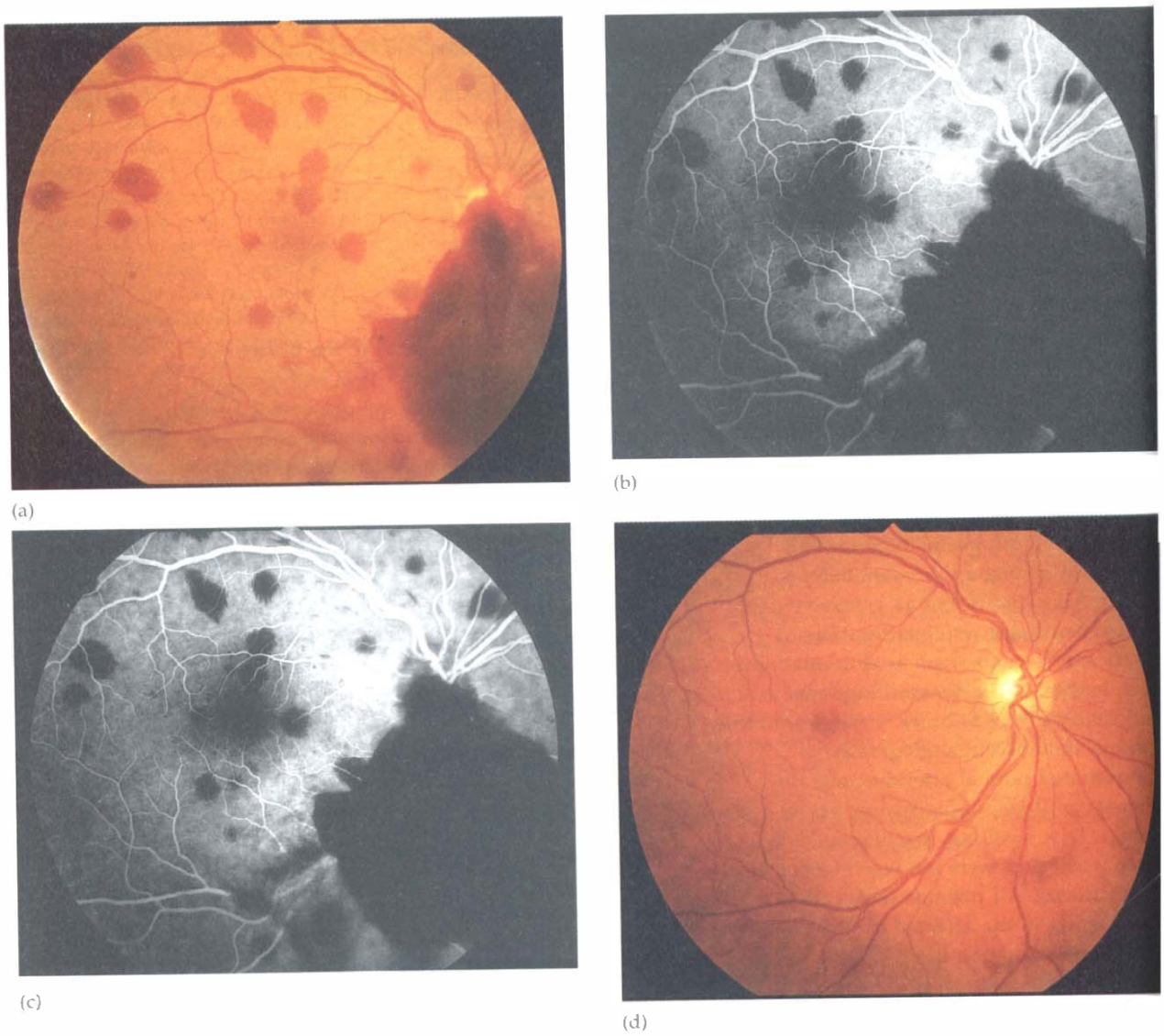


Fig. 1. *Case 1. (a) Colour photograph of the right fundus with multiple blot haemorrhages, large preretinal haemorrhage with breakthrough into the vitreous and normal venous calibre. (b) Fluorescein angiogram, mid-venous phase. There is haemorrhagic masking, no ischaemia, and normal capillary and arteriovenous flow. (c) Fluorescein angiogram, late phase. No vessel leakage is present. (d) Absorbing preretinal haemorrhage. There is full resolution of retinal haemorrhages 2 months from onset.*

vessel leakage nor cotton wool spots (Fig. 1b, c). The arteriovenous passage times were within normal limits. Additional investigations included duplex carotid examination and magnetic resonance imaging of the brain and orbits, both of which were normal.

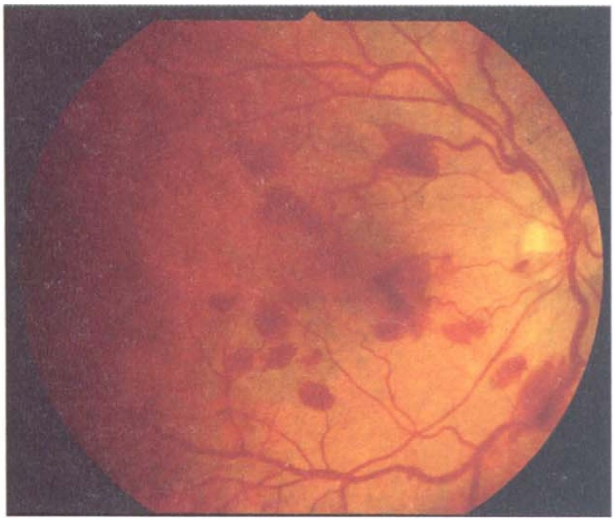
Two months later her symptoms had resolved and right visual acuity returned to 6/9 corrected. A few red cells could still be seen in the vitreous but the retinal haemorrhages had resolved (Fig. 1d).

Case 2

A 44-year-old white woman presented with a sudden onset of blurred right vision and a patchy scotoma. She denied Valsalva manoeuvres or ocular trauma but had, 2 days prior to presentation, returned from Australia in a pressurised commercial aircraft. Past ophthalmic and medical histories were unremarkable. The right visual acuity was 3/60 corrected and left 6/5-2 with no relative afferent pupillary defect.

Intraocular pressures and anterior segments were normal. Right fundal examination revealed widespread deep blot haemorrhages centred on the macula and optic disc with slight venous dilatation of the temporal veins (Fig. 2a). The distribution of the haemorrhages was similar in size and shape to those of case 1. There was no preretinal haemorrhage present. The left fundus was entirely normal. The only abnormality on haematological testing was a borderline microcytic hypochromatic anaemia with haemoglobin 11.5 and mean cell volume 80.8.

Fluorescein angiography was performed 1 week later, by which time the vision had improved to 6/18 corrected in the right eye (Fig. 2b). The angiogram showed, as for case 1, haemorrhagic masking of the choroidal circulation and an intact capillary circulation (Fig. 2b). There was slight staining of the upper and lower temporal vein walls in the late stages of the study.



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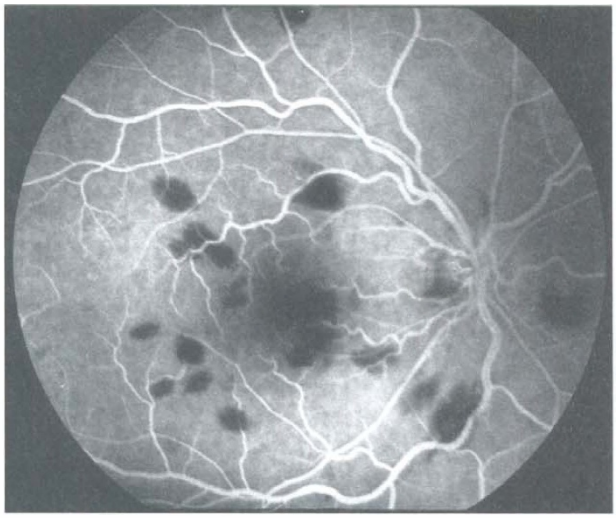

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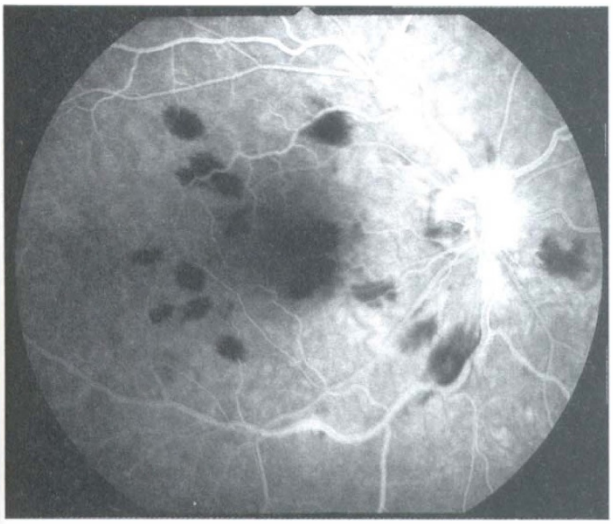

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Fig. 2. *Case 2. (a) Colour photograph of the right eye with multiple blot haemorrhages, mild venous dilatation and no optic disc swelling. (b), (c) Angiograms showing slight venous dilatation and mild staining of the inferotemporal veins.*

At the final review 7 months after the haemorrhage the right fundus had a clinically normal appearance and the right visual acuity was 6/12.

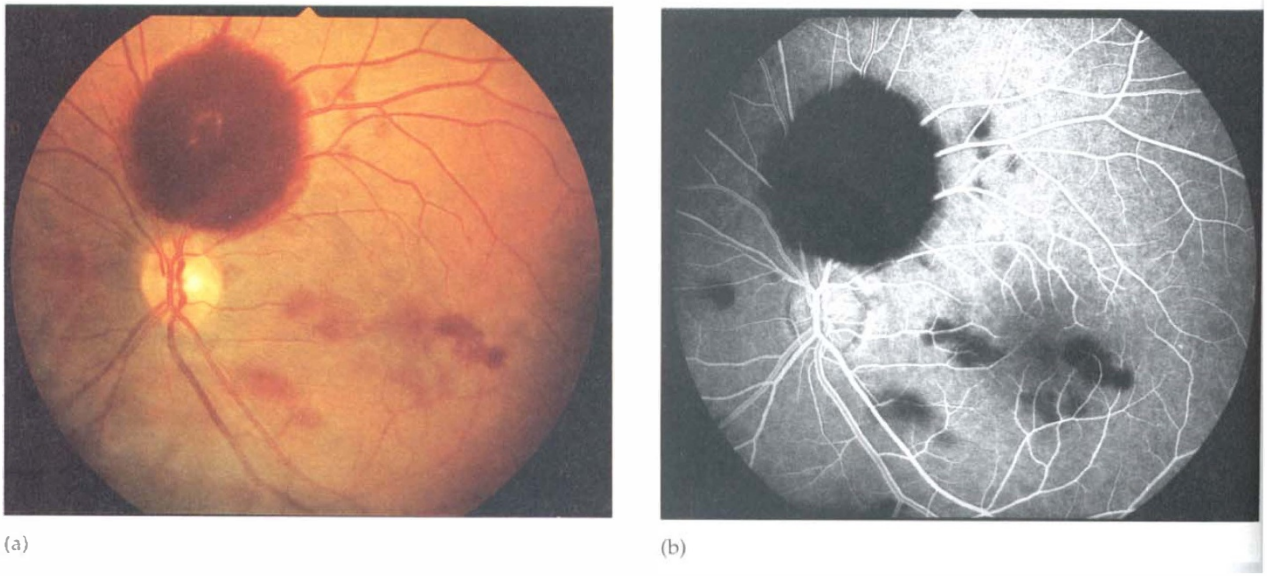
Case 3

A 24-year-old black man awoke with symptoms of red floaters and decreased vision in his left eye. The only other history offered was mild blunt trauma sustained to the right side of his face 2 months previously without ocular involvement. His left visual acuity was 6/60 unaided and 6/6 on the right. Anterior segments and intraocular pressures were normal. The left fundus had widespread retinal haemorrhages and a large preretinal haemorrhage over the superior temporal vein (Fig. 3a). The haemorrhages were in the deep retina and similar in appearance to the previous cases. Haemoglobin electrophoresis detected SA heterozygous haemoglobin; he was not previously known to have sickle cell trait. The remainder of the blood tests, including viscosity, urea and electrolytes, liver function tests and VDRL, were normal. Fluorescein angiography performed 1 week later demonstrated a normal capillary circulation with normal arteriovenous flow (Fig. 3b, c).

At final review 2 months after presentation the left visual acuity had improved to 6/9 unaided. The retinal haemorrhages were clearing and no vascular abnormality was seen in the retinal vessels, including the area underlying the localised large upper temporal haemorrhage.

Case 4

A 62-year-old white woman presented with blurred vision in her right eye. Two years previously she had successful argon retinopexy of a retinal tear in her left eye. Her only medical history of note was hormone replacement therapy. On examination her right visual acuity was 6/36 and left 6/9. Anterior segments and intraocular pressures were normal. The retina had widespread discrete blot haemorrhages, without significant venous dilatation, and a small preretinal haemorrhage was present below the optic disc (Fig. 4a).



(a) (b)

(c)

Fig. 3. *Case 3. (a) Colour photograph of the left eye with multiple blot haemorrhages, normal venous calibre and preretinal haemorrhage with a pale centre from denatured blood. (b), (c) Angiograms showing masking from haemorrhages but no capillary abnormalities.*

Fluorescein angiography showed normal arteriovenous flow and intact capillary circulation (Fig. 4b, c). A right carotid bruit was auscultated but a duplex carotid study detected no flow disturbance. Full blood count, viscosity, lipids, glucose, urea and electrolytes were normal.

Three weeks after presentation she developed worsening of her symptoms of floaters associated with a posterior vitreous detachment. No retinal tears were present. After 2 months the right visual acuity had improved to 6/9 with resolution of the retinal haemorrhages.

Case 5

A 39-year-old black man presented to the casualty department with a 'red blob' in the vision of his left eye. He had no history of trauma, coughing, Valsalva manoeuvre, preceding sexual activity nor other ocular or neurological symptoms. He had no previous ocular history, was in good health and was on no medications. He was a known sickle trait carrier (SA haemoglobin).

Examination showed visual acuities of 6/4 in the right eye and 6/60 in the left, improving to 6/24 with a pinhole. The left fundus had scattered blot retinal haemorrhages within the neuroretina, accompanied by subretinal and preretinal haemorrhages. A vitreous gel haemorrhage was also present (Fig. 5a).

Investigation for haematological abnormalities showed normal levels for full blood count, serum glucose, syphilis serology, C-reactive protein, angiotensin converting enzyme, ANCA, coagulation screen, fibrinogen concentration, serum urea and electrolytes and liver function tests. His viscosity was 1.76 and his autoimmune profile showed positive for nucleolar antinuclear factor at 1:40. Fluorescein angiography revealed masking of areas associated with haemorrhages but no other vessel or capillary abnormalities (Fig. 5b).

Over the next 3 months the haemorrhages cleared apart from a small amount of vitreous gel blood. His vision returned to 6/6 unaided and his retinal vasculature appeared normal. He failed further follow-up appointments.

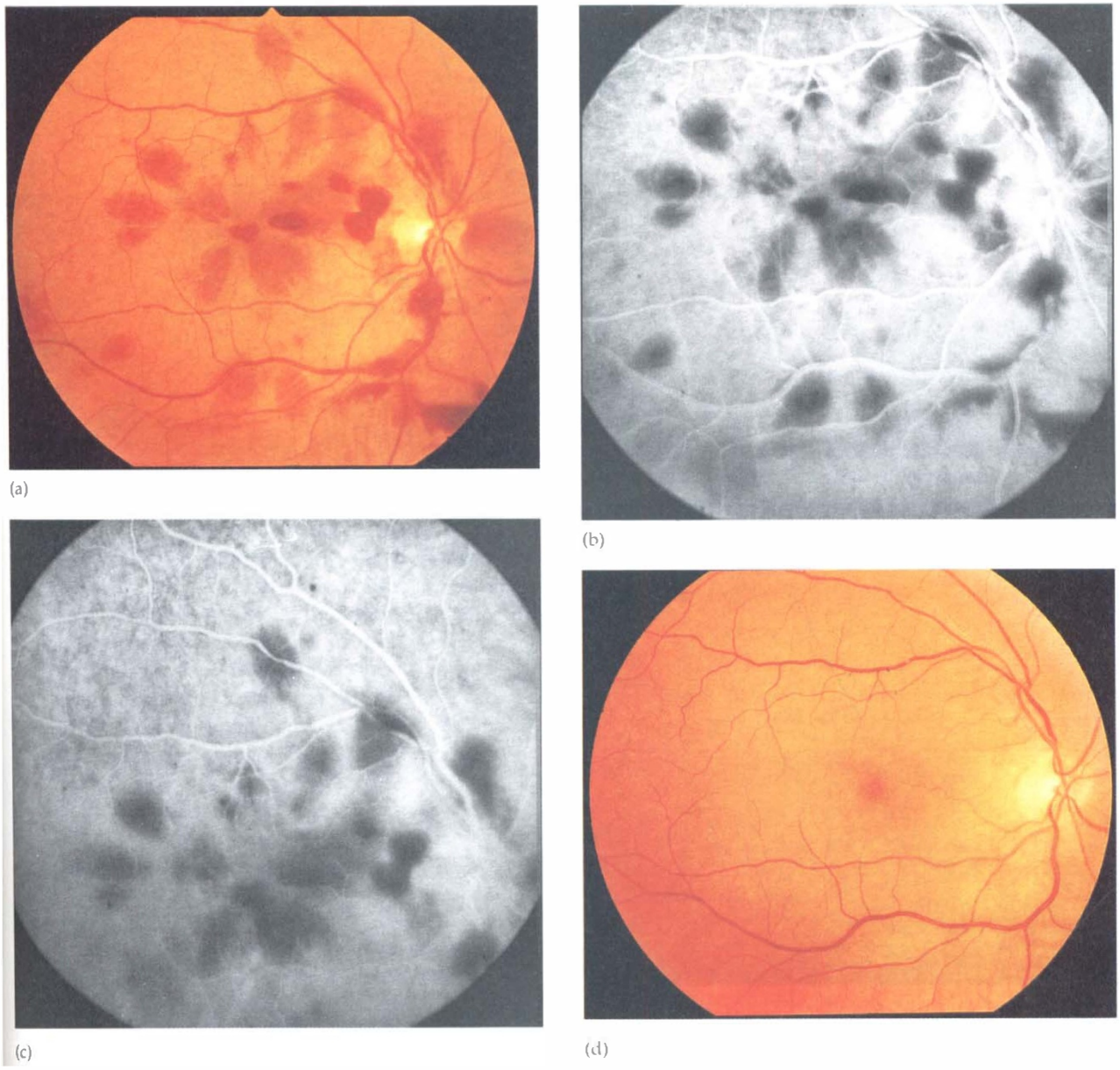


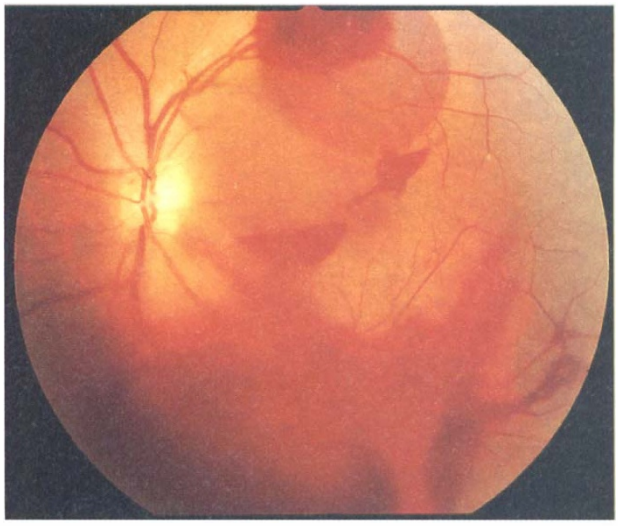
Fig. 4. *Case 4. (a) Colour photograph of the right eye with multiple intra- and subretinal haemorrhages. (b), (c) Fluorescein angiograms with a normal vascular bed apart from masking by haemorrhages. (d) Colour photograph 6 months later showing resolution of haemorrhages. Angiography at this time was normal apart from a few small window defects of the pigment epithelium.*

Discussion

This group of five cases showed an unusual clinical picture which appears not to have been described before in the literature. The patients' ages ranged from 24 to 62 years; three were white women and two were black men. The condition was invariably unilateral causing disturbance of vision for a few weeks. The pattern of the intraretinal haemorrhages was characteristic with large circumscribed blotches, confined to the posterior retina around the disc and macula.

Disc oedema did not occur and in all cases fluorescein angiography showed the arteriovenous and capillary circulation to be normal in spite of the condition being severe enough to cause blood to break through into the vitreous cavity in four cases. Considering the severity of the haemorrhages it was surprising that the retinal vascular bed was so normal. The significant differences in these cases from retinal vein occlusions, including partial vein occlusions, are the absence of disc oedema, normal-calibre veins and the size and distribution of the haemorrhages. Furthermore fluorescein angiogram abnormalities in cases of vein occlusions may demonstrate prolonged arteriovenous transit times, capillary closure or leakage and disc leakage. None of these cases had these features although case 2 showed slight staining of segments of the vein walls.

Benign retinal vasculitis was also considered in the differential diagnosis. This is a unilateral condition affecting younger patients that is said to be analogous to central retinal vein occlusion in older groups.[6] Scattered haemorrhages, disc oedema, vessel sheathing, cotton wool spots and macular oedema typically occur, but vitreous haemorrhage is absent, again distinguishing these five patients. In benign retinal vasculitis the retinal disturbance is thought to result from a haemodynamic



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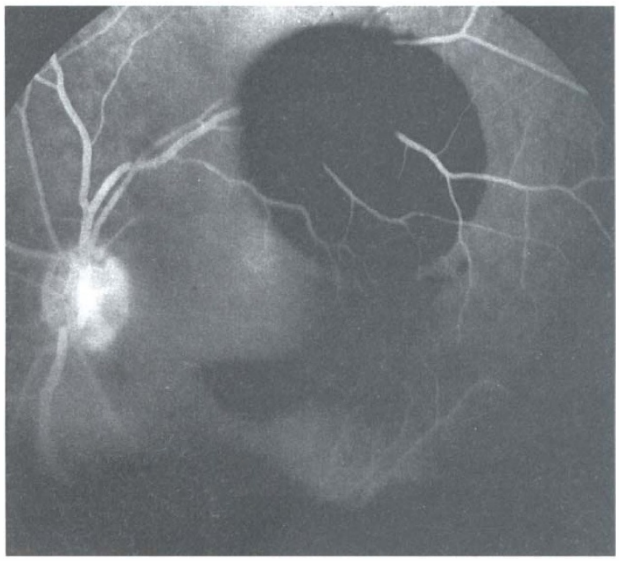

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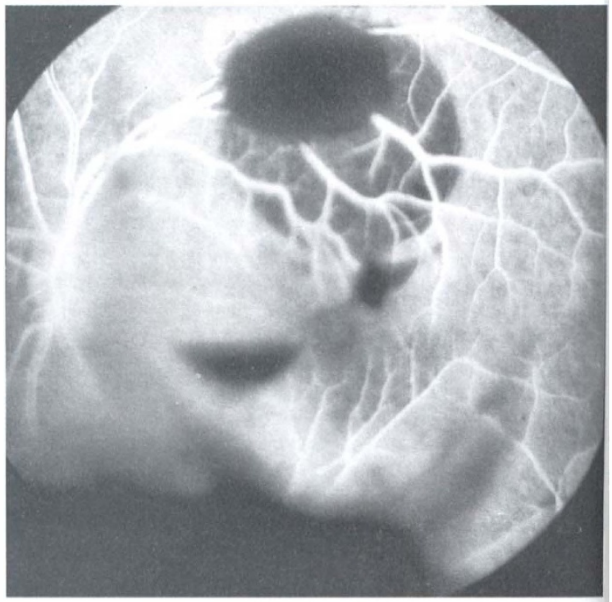

(b)

Fig. 5. *Case 5. (a) Colour photograph of the left fundus with multiple retinal, subretinal and preretinal haemorrhages. (b), (c) Early-phase and late-phase angiograms with normal vasculature between the areas of masking.*

abnormality with normal arterial pressures and grossly elevated venous pressures (when measured by ophthalmodynamometry).[6] If our group of patients had raised venous pressures accounting for the haemorrhage then its duration or severity was insufficient to produce the changes seen in benign retinal vasculitis. In each case we were unable to find a cause for raised venous pressure.

In view of the first patient's large preretinal haemorrhage the possibility of Terson's syndrome was considered. Magnetic resonance imaging was, therefore, performed which excluded a subarachnoid haemorrhage. In Terson's syndrome a sudden rise in intracerebral pressure secondary to subarachnoid haemorrhage is thought to produce acute retinal venous obstruction,[7] and it is possible that a milder event has occurred in our patients. Increased intracerebral pressure ruptures intraretinal vessels and haemorrhage can be found beneath, within and anterior to the retina.[8] The haemorrhages are not due to a direct communication from subarachnoid haemorrhage.[9] The clinical appearances are usually bilateral but may be very asymmetrical. Ballyntyne[10] suggested that the vulnerability of retinal veins to pressure at areas such as bifurcations, junctions and alterations in direction or support may account for their ability to be obstructed in subarachnoid haemorrhage. In spite of detailed questioning there was no significant history of straining, strangulation or other Valsalva-type manoeuvres which would have raised intracerebral pressures, and we do not consider this to be a Valsalva retinopathy. Four of the five patients were asked whether the visual disturbance followed sexual activity. This was denied by all four and it did not seem that any form of sexual practice, strangulation or straining, was involved in causation.

Systemic examinations were all negative; in particular no patients had a history of thrombo-embolic diseases. Anaemia, if severe, can produce a similar haemorrhagic appearance. The second patient's haemoglobin was 11.5 g/l with an MCV of 80.8, which is unlikely to have a significant effect on the blood rheology. Also, with the second patient we considered altitude retinopathy since ascent above altitudes of 3000 m has been shown to cause engorgement and tortuosity of retinal vessels.[1] Retinal

haemorrhages may develop at high altitude, similar to the retinopathy in our patients. However, altitude sickness does not occur in pressurised aircraft and does not have a delayed onset as in case 2. A Purtscher's retinopathy can also occur after air travel,[2] but usually only after moderate or severe chest trauma in association with crash landings. In addition Purtscher's retinopathy has ischaemic features which clearly distinguish it from this group of patients. The presence of sickle cell trait was considered for the third and fifth patients but the typical pattern of haemorrhages seen with sickle cell retinopathy was not observed. These tend to be mid-peripherally located, salmon patch progressing to sunburst appearance with or without schisis cavities.[11] Furthermore, the sickle cell trait is only known to produce sickling in extreme hypoxia and is then associated with other systemic manifestations.[12,13] Our patients were well at the onset of visual symptoms.

A bleeding tendency might theoretically cause a haemorrhagic retinopathy although this seems exceptionally rare in clinical practice. None of the study patients had any family history of bleeding tendency and 3 of the patients were female, which would exclude X-linked disease. All 5 patients had normal platelet counts and morphology. Four patients had liver function tests, which were normal except in one case with a mildly elevated alkaline phosphatase at 101 μg/l (normal 21–92). One patient had a clotting screen which was normal and a further patient was discussed with a haematologist who considered a bleeding disorder to be unlikely in the clinical circumstances.

A near-identical pattern of haemorrhage has been reported recently in one patient taking Ecstasy (3,4-methylenedioxymethamphetamine),[14] the suggested mechanism being that of a drug-related hypertensive episode. All our patients were normotensive. Pitta *et al.*[15] described a series of 9 young adult patients with seemingly spontaneous haemorrhagic retinopathy. In their cases the haemorrhages were solitary and lay near the macula. They suspected the cause was physical exertion. Pruett *et al.*[16] described 20 patients with a similar benign solitary macular microhaemorrhagic retinopathy and concluded the cause was multifactorial. The clinical pictures in both these series were quite different from the much more widespread retinopathy described here.

Haematological tests revealed no consistent abnormality. Case 1 had slightly elevated cholesterol and a non-specific polyclonal increase in gamma-globulin. Case 2 had a slight anaemia. Cases 3 and 5 had SA trait and case 4 had no abnormalities.

Although there were some variations in the severity of the haemorrhages, intraretinal haemorrhages were found in all cases with a characteristic blotchy appearance. It was observed that in some of the cases the bleeding was severe enough to extrude into the subretinal space and also forwards into the vitreous cavity. A similar picture can be seen with retinal macroaneurysms but none of these cases had any vascular abnormalities.

It would seem in our group of patients that an unknown factor was producing an acute haemorrhagic retinopathy. A possible mechanism may have been obstruction to venous outflow which was so short lived as to result in only minor venous dilatation. Optic disc oedema did not develop, but the pressure rise was sufficient to rupture vessels, producing these characteristic posterior retinal haemorrhages. The episode was also of insufficient duration or severity to produce retinal ischaemia or capillary damage demonstrated by fluorescein angiography. Since axoplasmic transport was not interrupted, disc oedema does not develop. The clinical presentations and progress of each patient were sufficiently similar for us to diagnose benign idiopathic haemorrhagic retinopathy. The importance of this diagnosis is that the patient can be reassured that treatment is not required and that a return to a good level of visual acuity can be expected.

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