Clinical Reports

Spontaneous hyphaema as a result of systemic anticoagulation in previously abnormal eyes

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Summary: Spontaneous hyphaema in patients on systemic anticoagulants has been described in normal eyes and also in eyes with certain intraocular lenses following cataract surgery. These cases are rare and in all the reported cases the hyphaemas resolved without sequelae. Four cases are reported here of spontaneous hyphaemas in previously abnormal eyes of patients on anticoagulants. Three of these patients suffered considerable pain as a result of this. The reasons for this are discussed and early ophthalmic referral recommended if a hyphaema is suspected in these situations.

Introduction

Spontaneous bleeding into the anterior chamber in patients on systemic anticoagulants is rare, especially considering the number of patients on these drugs. Certain pre-existing ocular conditions may predispose patients to spontaneous hyphaema when anticoagulated. Four such cases are presented here.

Case reports

Case 1

A 61 year old male was commenced on warfarin following an uncomplicated aortic valve replacement. An ophthalmic opinion was obtained post-operatively because of blurred vision in his left eye, his right eye being blind from trauma since childhood. The left eye had a refractive error only and the right eye had optic atrophy, presumed related to the previous trauma. Six weeks later he was readmitted because of overanticoagulation, with an International Normalized Ratio (INR) of 7.1. His warfarin dose was reduced appropriately. Prior to discharge his blind eye was noted to be red but no action was taken. A week later he was referred to the eye department with severe pain in this eye. There was a total (100%) hyphaema of the right eye, the anterior chamber being completely filled with blood. The intraocular pressure (IOP) was

42 mmHg (normal 10–20 mmHg) and the cornea was oedematous. The INR at that time was 3. Following treatment with topical dexamethasone, timolol maleate and oral acetazolamide, the IOP normalized. The hyphaema resolved in 6 weeks. No clinical iris neovascularization was seen.

Case 2

A 40 year old female with insulin dependent diabetes mellitus was started on warfarin, following heparinization, for a deep venous thrombosis of the left leg. The right eye was blind because of severe proliferative diabetic eye disease and had had multiple retinal laser treatments at the eye department. Six days after commencing anticoagulation she developed pain in the right eye with vomiting. An ophthalmic opinion was sought the following day and a total hyphaema was noted with resolving corneal oedema. The IOP was 24 mmHg. She was found to be over anticoagulated with an INR over 5 and required vitamin K to reverse this. The eye was kept comfortable with medical therapy and the hyphaema resolved in 4 weeks. Iris neovascularization was noted clinically at this stage.

Case 3

A 69 year old male was anticoagulated with warfarin because of a pulmonary embolus. His left eye was blind due to a retinal vein thrombosis. The commonly associated secondary glaucoma had been prevented with retinal laser treatment. Six weeks after starting warfarin he was seen in the eye department with a 2-week history of a painful left eye. There was a 40% hyphaema, an IOP of

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32 mmHg and corneal oedema. Neovascularization was present on the visible iris. His INR was 5 necessitating a reduction in the dose of warfarin. The pain resolved with topical treatment to the eye and the hyphaema cleared after 5 weeks.

Case 4

A 74 year old male had been started on warfarin 3 months after a pulmonary embolus. He presented to the ophthalmic department with a 2-day history of a painless red right eye. The vision had been poor in that eye for at least a year but he had not sought medical advice for this. There was a 50% hyphaema in the right eye, the IOP was normal as was the cornea. The right optic disc was pale with shunt vessels, suggestive of a previous retinal vein occlusion. No iris neovascularization was seen. The INR was greater than 5 and the dose of warfarin was reduced. No ocular treatment was required and the hyphaema resolved in 2 weeks (Figure 1).

Discussion

Spontaneous non-traumatic hyphaema in patients on anticoagulants with normal eyes is rare, with only one reported case in the literature.¹ Intra-ocular lenses of the type attached to the iris can cause hyphaemas, particularly in anticoagulated patients.² Other causes of spontaneous hyphaemas include bleeding dyscrasias,³ transient defects in platelet function,⁴ Fuch's heterochromic cyclitis,⁵ abnormal iris vessels,⁶ and iris vascular tufts.⁷ Abnormal iris vessels can arise *de novo* or more commonly as a result of an ischaemic eye. These

vessels are frail and prone to haemorrhage. Ocular ischaemia can be secondary to local inflammatory conditions and trauma; or associated with systemic cardiovascular pathology in the form of diabetic eye disease, retinal vein occlusion and carotid insufficiency.⁸ Secondary acute glaucoma is a known complication of a hyphaema and is more likely with large haemorrhages, the mechanism being transient obstruction of the trabecular meshwork with red blood cells, plasma and fibrin.⁹ Late complications include chronic secondary glaucoma and permanent corneal staining.¹⁰

In the cases reported all the eyes were abnormal prior to anticoagulation, with underlying ocular ischaemia a possibility in all four. Two eyes were known to have iris neovascularization without secondary glaucoma and the other two may well have had subclinical neovascularization. Iris fluorescein angiography can demonstrate subclinical neovascularization but the risks of this procedure were not felt to be justified in these cases. All were found to be over anticoagulated at, or prior to, the bleed and in all four the hyphaemas were large. Three of the cases had an acute rise in IOP, this being transient in case 2. These patients suffered considerable pain and were admitted to hospital as a result.

All 4 cases occurred within one 6-month period and were from 3 separate units. Patients vary in their sensitivity to warfarin¹¹ and a proportion of patients commenced on anticoagulants are at some stage overanticoagulated.¹² Considering the rarity of bleeding in normal eyes of patients on anticoagulants, abnormal (particularly ischaemic) eyes appear to be more prone to spontaneous hyphaema following excessive anticoagulation.

Figure 1 Case 4: 50% hyphaemia.

Patients with ocular ischaemia often have associated cardiovascular pathology and may well come under the care of a physician. Therefore a

high index of suspicion should be maintained in these patients and if ocular bleeding is suspected, early ophthalmic referral is recommended.

References

1. Koehler, M.P. & Sholiton, D.B. Spontaneous hyphema resulting from warfarin. *Ann Ophthalmol* 1983, **15**: 858–859.
2. Butler, L. & Roper-Hall, M.J. Delayed microhyphaema with intraocular lenses: a retrospective study of eight patients. *Br J Ophthalmol* 1989, **73**: 106–110.
3. Kagler, W.V., Mouke, J.L. & Garcia, C.A. Spontaneous hyphaema associated with ingestion of aspirin and ethanol. *Am J Ophthalmol* 1976, **82**: 631–634.
4. McDonald, C.J., Raafat, A., Mills, M.J. & Rumble, J.A. Medical and surgical management of spontaneous hyphaema secondary to immune thrombocytopaenia. *Br J Ophthalmol* 1989, **73**: 922–925.
5. Kanski, J.J. In: *Clinical Ophthalmology*, 2nd edition. Butterworths, London, 1990. pp. 166–167.
6. Magauran, D.M. Unilateral spontaneous hyphaema. *Br J Ophthalmol* 1973, **57**: 945–947.
7. Cobb, B. Vascular tufts at the pupillary margin: a preliminary report. *Trans Ophthalmol Soc UK* 1968, **88**: 211–221.
8. Newell, F.W. *Ophthalmology: Principles and Concepts*, 6th edition. CV Mosby, St Louis, 1986, pp. 289.
9. Sternberg, P., Tripathi, R.C., Tripathi, B.J. & Chilcote, R.R. Changes in outflow facility in experimental hyphema. *Invest Ophthalmol Vis Sci* 1980, **19**: 138–1391.
10. Brodrick, J.D. Corneal blood staining after hyphaema. *Br J Ophthalmol* 1972, **56**: 589–593.
11. Routledge, P.A., Chapman, P.H., Davies, D.M. & Rawlins, M.D. Factors affecting warfarin requirements. *Eur J Clin Pharmacol* 1979, **15**: 319–322.
12. Sharma, N.K., Routledge, P.A., Rawlins, M.D. & Davies, D.M. Predicting the dose of warfarin for therapeutic anticoagulation. *Thromb Haemost* 1982, **47**: 230–231.