

Fig. 2. B-scan ultrasonography demonstrating disc drusen at the optic nerve head.

the lamina cribrosa. They occur with a frequency of 3.4–20 per 1000 in the general population, and 72% are bilateral.⁵ Abnormal axonal metabolism and possibly axonal degeneration have been implicated in their causation, which can occur at any age.⁶

The pathophysiology of venous thrombosis is determined mainly by the triad of Virchow (hypocirculation, endothelial lesion of vessels, coagulation disturbances).⁷ The mechanism for thrombus formation in this patient would appear to be a combination of altered flow, the drusen causing distal narrowing of the vein and a hypercoagulable state. Green *et al.*³ describe secondary changes in the vein with narrowing of the blood column and disturbance and slowing of the venous blood flow. The induced turbulence of venous flow may then lead to endothelial damage and secondary thrombosis and occlusion.³

Oral contraceptives increase the risk of retinal vascular lesions,⁸ and recent data support the view that retinal vein occlusion is a contraindication to the further use of hormonal contraception.⁹ Norris and Bonnar¹⁰ suggested that the increased incidence of thrombovascular disease is mediated by an increase in the activity of coagulation factors VII, X and fibrinogen. However, increased fibrinolysis and enhanced platelet activity have also been demonstrated, thus preserving haemostatic balance.¹⁰

This case report illustrates that optic disc drusen in association with CRVO is recognised more histologically than clinically and that investigatively B-scan ultrasonography should be performed. It further demonstrates the multifactorial aetiology of CRVO. In this patient the presence of disc drusen alone was not sufficient to cause the occlusion. Hypercoagulability caused by hormone ingestion precipitated a CRVO. Normal retinal vascular anatomy and visual function were restored, reflecting the transient effect of the hormone on the coagulation mechanisms, allowing resorption of the clot before secondary changes occurred.

This suggests a possible role for thrombolytic therapy already investigated by Kohner *et al.*,¹¹ who demonstrated a treatment benefit with streptokinase. However, this may have been responsible for vitreous

haemorrhage in 15% of patients. At the time of this study, modern vitrectomy was not established and these patients suffered irreversible visual loss. Recent pilot studies suggest low-dose fibrinolytic therapy was an ideal approach to fibrinolysis in retinal vein occlusion in light of the fact that the occurrence of bleeding complications constitutes a dose-dependent problem.¹² We feel that this work should be revisited and that the benefits of streptokinase in selected cases should be investigated in a controlled clinical trial.

References

1. British National Formulary no.39. London: British Medical Association/The Pharmaceutical Press, 2000:372.
2. Magargal LE, Gonder JR, Mather V. Central retinal vein occlusion in the young adult. *Trans PA Acad Ophthalmol Otolaryngol* 1985;37:148–53.
3. Green WR, Chan CC, Hutchins GM, Terry JM. Central retinal vein occlusion: a prospective histopathologic study of 29 eyes in 28 cases. *Retina* 1981;1:27–55.
4. Chern S, Magargal LE, Annesley WH. Central retinal vein occlusion associated with drusen of the optic disc. *Ann Ophthalmol* 1991;23:66–9.
5. Brodrick JD. Drusen of the disc and retinal haemorrhages. *Br J Ophthalmol* 1973;57:299–306.
6. Tso MOM. Pathology and pathogenesis of drusen of the optic nerve head. *Ophthalmology* 1981;88:1066–80.
7. Breddin HK. Thrombosis and Virchow's triad. What is established? *Semin Thromb Hemost* 1989;15:237–9.
8. Vessey MP, Hannaford P, Mant J, Painter R, Frith P, Chappel D. Oral contraception and eye disease, findings in two large cohort studies. *Br J Ophthalmol* 1998;82:538–42.
9. Kirwan JF, Tsaloumas MD, Vinall H, Prior P, Kritzinger EE, Dodson PM. Sex hormone preparations and retinal vein occlusion. *Eye* 1997;11:53–56.
10. Norris LA, Bonnar J. Haemostatic changes and the oral contraceptive pill. *Baillière's Clin Obstet Gynaecol* 1997;11:545–64.
11. Kohner EM, Pettit JE, Hamilton AM, Bulpitt CJ, Dollery CT. Streptokinase in central retinal vein occlusion: a controlled clinical trial. *BMJ* 1976;I:550–3.
12. Hattenback LO. Systemic lysis therapy in retinal vascular occlusions. *Ophthalmology* 1998;95:568–75.

M.J. Gallagher
L.G. Clearkin
Arrow Park Hospital
Upton
Wirral
Merseyside, UK

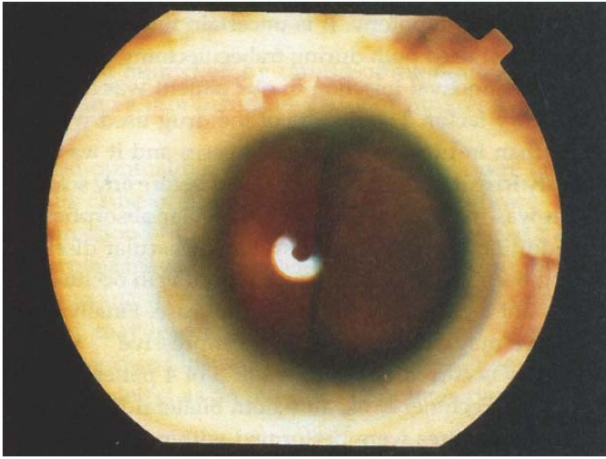
Dr M.J. Gallagher ✉
Ophthalmology Department
Bradford Royal Infirmary
Duckworth Lane
Bradford BD9 5RJ, UK

Tel: +44 (0)1274 364116
Fax: +44 (0)1274 366768

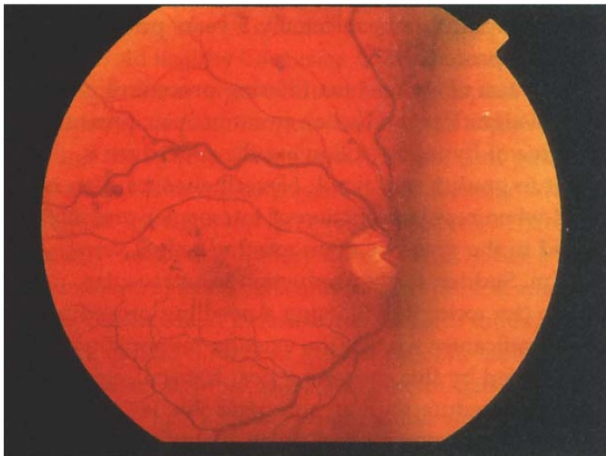
Sir,

Worsening of an existing hemispheric retinal vein occlusion following further hypotony procedure

Retinal vein occlusion is well recognised as a complication of high intraocular pressure in glaucoma patients.¹ It is rarely known as a result of hypotony following glaucoma filtering surgery. We report a patient



(a)



(b)

Fig. 1. (a) Post-operative slit-lamp biomicroscopy of the right eye reveals a large progressive choroidal effusion. (b) Closer detail shows the presence of the initial mild superior hemispheric retinal vein occlusion, and enlarging choroidal effusion threatening the optic nerve head.

with advanced glaucomatous disc damage who developed a mild superior hemispheric vein occlusion immediately following a trabeculectomy with the antimetabolite, 5-fluorouracil. However, the retinopathy significantly worsened following a bleb needling procedure with repeat subconjunctival 5-fluorouracil injection, which has not previously been reported.

Case report

A 62-year-old Caucasian man with primary open-angle glaucoma underwent a successful and uncomplicated trabeculectomy to his left eye in 1994 and argon laser trabeculoplasty in 1996 to his right eye. His right eye continued to deteriorate with gross field defect, his management being complicated by his allergy to multiple topical treatments. He eventually underwent an uneventful right trabeculectomy with 5-fluorouracil. His pre-operative best corrected vision was 6/6 with an intraocular pressure of 22 mmHg, a cup/disc ratio of 0.9 and an otherwise healthy retina.

On the first post-operative day there was a well-formed bleb with a small leak. The anterior chamber was shallow but formed, with zero intraocular pressure and small peripheral choroidal effusion. In addition, there were scattered superficial retinal haemorrhages involving the superior half of the posterior pole – a finding not present prior to his surgery (Fig. 1). His visual acuity was 6/9 and reformation of the anterior chamber was considered but declined by the patient at this stage.

By the eighth post-operative day the choroidal detachment had progressed, almost obscuring the optic nerve head (Fig. 1). The patient finally agreed to have resuturing of the bleb with reformation of the anterior chamber, which corrected the bleb leakage, and deepened the anterior chamber with resolution of the choroidal detachment. Intraocular pressure, however, rose slowly to the pre-operative level by the second week. Needling of the encysted bleb with subconjunctival 5-fluorouracil injection (0.2 ml of 25 mg/ml concentration) was therefore performed. Again, the intraocular pressure dropped to 2 mmHg immediately and subsequently stayed below 10 mmHg, without additional topical antiglaucoma medication. However, the patient experienced further deterioration of visual acuity to 6/18, when reviewed at 10 days following the needling procedure. There was minimal formation of nuclear sclerosis but the reduction in vision was largely attributed to formation of much denser retinal haemorrhages with cystoid macular oedema which remained localised to the superior retinal hemisphere (Fig. 2). Past medical history, systemic examination and subsequent blood tests had revealed no risk factors predisposing to his development of retinal vein occlusion.

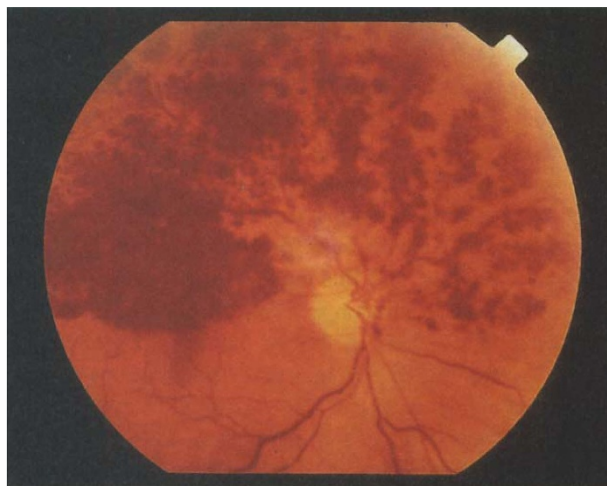


Fig. 2. Following the bleb needling procedure, fundoscopy of the right eye reveals worsening of the hemispheric retinal vein occlusion with denser retinal haemorrhages affecting the fovea.

Comment

Central retinal vein occlusion in association with sudden hypotony from different glaucoma filtering procedures has been under-reported.²⁻⁵ Visual prognosis seems to be related to different types of retinal haemorrhages described. For example, Fechter *et al.*⁴ described decompressive retinopathy, widespread blot haemorrhages with white centres of different sizes in the midperiphery, which has the most benign outcome. However, cases which manifest as more typical of central retinal vein occlusion often have the worse visual prognosis.³

Some risk factors may be predictive of an individual's risk of this complication following trabeculectomy procedures. Firstly, advanced cupping of the optic nerve and gross field defect detected pre-operatively have been the common features in cases reported.^{2,4} One possible explanation may be that the lamina cribrosa is much weaker in the advanced glaucomatous eye, and the sudden reduction of intraocular pressure could lead to its anterior shift, resulting in obstruction of the venous outflow.⁶ Another possible explanation is that the rapid and large decrease in intraocular pressure causes a sudden, transient increase in the retinal and choroidal blood flow, overwhelming the capacitance of the vascular system and resulting in acute extravasation of blood into the extravascular space.⁴

Secondly, post-operative hypotony with very low intraocular pressure is a common feature in patients developing this complication. However, pre-operative intraocular pressure levels do not seem to play an important role: pressures in previously reported cases ranged from 20 to 40 mmHg.^{2,4} A needling procedure is now an increasingly common practice to lower the intraocular pressure for failed trabeculectomy, both at the early stage of Tenon's cyst formation and at a later stage of vascularised bleb failure. In the latter, if needling is followed with 5-fluorouracil injection, up to 80% success rate is possible.⁷ Tenon's cyst, however, seems to occur much less commonly in eyes that have received antimetabolite agents. If the acute rise in intraocular pressure associated with these cysts is managed medically, most of the blebs continue to function later, as the bleb tissue remodels itself. If failure is imminent, as in this case of a shallow encysted bleb and higher intraocular pressure, needling of the cyst, with 5-fluorouracil injection, may be helpful.⁷

The use of antimetabolites, especially mitomycin C, has been associated with more pronounced and persistent hypotony, and this may indirectly increase the risk of retinal vein occlusion as a complication of filtering procedures. Nuyts *et al.*⁵ described the use of mitomycin C causing retinal haemorrhages and occlusion of both arterial and venous systems when given subconjunctivally following a needling procedure; the presumed mechanism for this is the diffusion of the drug into the vitreous cavity, causing retinal toxicity.⁵ Nevertheless, the effect of antimetabolites is more likely to be an indirect factor as all cases reported were

associated with hypotony. It is uncertain whether the 5-fluorouracil used both during trabeculectomy and later as a subconjunctival injection in our patient was a contributory factor. The dosage of the drug used was smaller than in previously reported cases and it was copiously irrigated from the scleral bed before any scleral incision was made, to minimise intraocular absorption.

In addition, the presence of systemic vascular disease has long been recognised to cause retinal vein occlusion, but was not a risk factor in the present case. Finally, the second eye may also be at risk. Decompressive retinopathy occurred in both eyes of 3 of 4 patients reported by Fechtner *et al.*⁴ in whom bilateral filtering surgical procedures were performed within 2 weeks of each other and any underlying systemic disease was not excluded. It is of note, that in our case the patient had had an uneventful trabeculectomy 5 years prior to his second eye procedure.

As the aim of a glaucoma filtering procedure is to achieve a significant reduction in intraocular pressure, the degree of hypotony following the procedure is difficult to predict and avoid. Nevertheless, caution is needed when repeat reduction of intraocular pressure is required in the presence of an existing retinal vein occlusion. Sudden further reduction in intraocular pressure (for example following a needling procedure) could significantly worsen the existing retinopathy, as demonstrated by this case. As a post-trabeculectomy needling procedure with an antimetabolite is increasingly common clinical practice, this potential complication of glaucoma filtering surgery resulting in visual deterioration may be considered, especially in high-risk individuals.

References

1. Dreyden RM. Central retinal vein occlusion and chronic simple glaucoma. *Arch Ophthalmol* 1965;73:659.
2. Dev S, Herndon L, Shields MB. Retinal vein occlusion after trabeculectomy with mitomycin C. *Am J Ophthalmol* 1996;122:574-5.
3. Suzuki R, Nakayama M, Satoh N. Three types of retinal bleeding as a complication of hypotony after trabeculectomy. *Ophthalmologica* 1999;213:135-8.
4. Fechtner RD, Minckler D, Weinreb RN, Frangei G, Jampol LM. Complications of glaucoma surgery: ocular decompression retinopathy. *Arch Ophthalmol* 1992;110:965-8.
5. Nuyts RM, Van Diemen HA, Greve EL. Occlusion of the retinal vasculature after trabeculectomy with mitomycin C. *Int Ophthalmol* 1994;18:167-70.
6. Yan DB, Coloma FM, Metheerairut A, Trope GE, Heathcote JG, Ethier CR. Deformation of the lamina cribrosa by elevated intraocular pressure. *Br J Ophthalmol* 1994;78:643-8.
7. Shin DH, Juzych MS, Klatana AK, Swendris RP, Parrow KA. Needling revision of failed filter blebs with adjunctive 5-fluorouracil. *Ophthalmic Surg* 1993;24:242-8.

Peck-Lin Lip
Patrick G. Corridan
The Wolverhampton & Midland Counties Eye Infirmary
Wolverhampton, UK
Mrs Peck-Lin Lip ✉
Birmingham & Midland Eye Centre
City Hospital NHS Trust
Dudley Road
Birmingham B18 7QH, UK