Figure 2 Spontaneous resolution of ERM. Color fundus photograph (A). Red-free photograph (B). Late-phase fluorescein angiogram with no leakage (C). OCT with significant reduction of retinal edema (D).

Pressure dependent stromal oedema following deep anterior lamellar keratoplasty

A 53 year old man with keratoconus and a steroid related intraocular pressure response developed acute hydrops and underwent deep anterior lamellar keratoplasty after poor spontaneous recovery of vision. Intraocular pressure rose to 40 mm Hg on postoperative administration of topical prednisolone 0.5%, resulting in a well localised area of stromal oedema. Resolution of the oedema followed reduction of intraocular pressure, but recurrence ensued if the pressure rose above 30 mm Hg. Following acute hydrops, the regenerative process involves endothelial proliferation across the break in Descemet's membrane. This localised functional deficit is demonstrated after only a moderate intraocular pressure rise.

Case report

A 53 year old man was referred with acute hydrops in the left eye. He had a history of asthma, severe atopic keratoconjunctivitis, keratoconus, primary open angle glaucoma controlled on latanoprost eye drops, and a steroid related rise in intraocular pressure. A penetrating keratoplasty had been carried out on the right eye eight years earlier, after which the patient achieved 6/9 best-corrected visual acuity (BCVA). Over the next two months the hydrops resolved, leaving apical scarring and a large visible break in Descemet's membrane. His BCVA improved from counting fingers to 6/60. He was contact lens intolerant, and therefore underwent a left deep anterior lamellar keratoplasty (by the Melles technique¹).

Postoperatively he was given 0.5% prednisolone eye drops three time daily and on review four weeks postoperatively his intraocular pressure had risen to 40 mm Hg. There was localised stromal oedema and mild epithelial oedema overlying the area of the previous break in Descemet's membrane. His intraocular pressure was lowered to 14 mm Hg with acetazolamide, and the stromal oedema cleared. Topical latanoprost was stopped to help control an exacerbation of asthma and his intraocular pressure subsequently rose to 32 mm Hg. Once again there was a localised area of stromal oedema overlying the previous break in Descemet's membrane, which cleared as the intraocular pressure was lowered to 20 mm Hg by topical dorzolamide. At three months post-operatively his topical steroid was discontinued and his intraocular pressure remained at 10 mm Hg. Three years later his corneal stroma is clear and he achieves 6/9 BCVA with a spectacle correction following suture removal.

Comment

Clarity of the normal cornea is achieved by maintaining the corneal stroma in a relatively dehydrated state. The intraocular pressure and stromal imbibition pressure promote the accumulation of fluid in the stroma. These forces are balanced by the osmotic gradient generated by active solute transport across the corneal membranes, particularly the endothelium. It has been shown that if the endothelial function is normal, then increased intraocular pressure does not cause stromal oedema.²

In advanced keratoconus, hydrops results from rupture of Descemet's membrane. Histological studies have shown that the endothelium then spreads across the break in

Descemet's membrane and secretes basement membrane, restoring the normal anatomy over three to four months. This correlates with the resolution of the stromal oedema, suggesting that there is functional as well as anatomical recovery of the endothelial layer.³ The case presented here, however, provides evidence that the function of the regenerated endothelium and basement membrane remains impaired.

The endothelium in the region of the break in Descemet's membrane was able to maintain the clarity of the overlying corneal stroma when the intraocular pressure was normal. However, when the intraocular pressure was raised, the cornea became oedematous. We could find no earlier documentation of this effect, presumably because such cases have previously undergone penetrating keratoplasty, removing the area of re-endothelialised stroma.

In summary, this case highlights the residual functional impairment of the regenerated endothelium and basement membrane at the site of a break in Descemet's membrane. Localised stromal oedema occurred overlying this region with only a moderate increase in intraocular pressure.

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References

- 1 Melles GRJ, Lander F, Rietveld FJR, *et al.* A new surgical technique for deep anterior lamellar keratoplasty. *Br J Ophthalmol* 1999;**83**:327–33.
- 2 Melamed S, Ben-Sira I, Ben-Shaul Y. Corneal endothelial changes under induced intraocular pressure elevation: a scanning and transmission electron microscopic study in rabbits. *Br J Ophthalmol* 1980;**64**:164–9.
- 3 Stone DL, Kenyon KR, Stark WJ. Ultrastructure of keratoconus with healed hydrops. *Am J Ophthalmol* 1976;**82**:450–8.

Retinal venous occlusion associated with depot medroxyprogesterone acetate

Although it is well-established that oestrogen-containing contraception has prothrombotic potential in women over 35 years of age, particularly in women who smoke, low dose progesterone-containing contraception, both oral and parenteral, has not been conclusively linked to prothrombotic events. We evaluated two patients who developed retinal vein occlusion after administration of depot medroxyprogesterone acetate (DMPA, Depo-ProveraTM, Pharmacia & Upjohn, Kalamazoo, Michigan, USA) for contraception.

Case reports

A 44-year-old, hypertensive, woman who smoked, presented with decreased visual acuity to the level of 6/200 in the left eye. A non-perfused hemiretinal vein occlusion was present. Ten weeks earlier, she had received a DMPA injection.

Nine months later, her right eye developed a non-perfused central retinal vein occlusion with decreased visual acuity to the level of count fingers (20/4000 visual acuity). Five weeks earlier, she had received DMPA. Family history and systemic evaluation for a hypercoagulable state was negative.

A 39-year-old, hypertensive, woman who did not smoke, noticed a change in her visual acuity to the level of 20/50 in her left amblyopic eye (20/40). Examination showed a non-perfused hemiretinal vein occlusion. She had received multiple DMPA injections over the past two years; however, her most recent injection was 10 weeks prior to presentation. Family history and limited systemic evaluation for a hypercoagulable state was negative.

Comment

Hormonal contraceptive strategies include the use of oestrogen, progesterone or a combination of both. There is a well-established association between the use of oestrogen-containing oral contraceptives and thrombotic disease; however, the association with retinal venous thrombosis is less well defined.

Medroxyprogesterone acetate is a synthetic progesterone derivative, progestin, that can be administered orally or as an intramuscular depot injection. The recommended contraceptive dose of DMPA is 150 mg by intramuscular injection every 13 weeks. The recommended oral dose of medroxyprogesterone acetate for contraception is 5–10 mg daily. Much larger daily doses of up to 1200 mg of medroxyprogesterone acetate are used in the treatment of breast, lung and prostate cancers. These larger doses have been associated with a slightly increased risk of thrombosis. Reported cases in oncology patients include pulmonary thrombosis, sagittal sinus thrombosis and intestinal thrombosis.^{1–3}

The package insert for the DMPA lists retinal thrombosis as a potential complication; however, no ocular events, such as retinal arterial or venous occlusion, have been reported. The lower cumulative doses of 150 mg DMPA injected every 3 months for contraception has not been conclusively associated with systemic thromboses. Of 11 500 women treated with DMPA for a total of 208 894 patient months, there were 15 cases of thrombophlebitic or thromboembolic disease reported.⁴ Three of the 15 affected patients had a prior history of thrombophlebitis or thromboembolism. None had a retinal vascular occlusion.

To our knowledge (<http://www.pubmed.gov> last searched 1 June 2007), the only reported ophthalmic adverse event associated with DMPA was a case of ischaemic papillopathy in a 32-year-old woman.⁵ Three days after her second injection, she experienced blurred vision in both eyes and bilateral optic disc oedema was present. Neurological examination and imaging were all normal. Two days after her third injection of DMPA, she again experienced blurred vision. The diagnosis of bilateral ischaemic papillopathy was made and DMPA was discontinued. This was the only case of an ischaemic papillopathy associated with DMPA reported.

Despite DMPA having a 30-year history as a safe and effective contraception for the vast majority, the two patients presented here suggest a possible causal association with retinal vein occlusion. We documented three eyes of two women that developed a retinal vein occlusion after receiving DMPA.

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References

- 1 Okada Y, Horikawa K. A case of phlebothrombosis of lower extremity and pulmonary embolism due to progesterone. *Kokyo To Junkan* 1992;**40**:819–22.
- 2 Hitosugi M, Kitamura O, Takatsu A, *et al.* A case of dural sinus thrombosis during the medication of medroxyprogesterone acetate. *Nippon Hoigaku Zasshi* 1997;**51**:452–6.
- 3 Nakagawa K, Tshima T, Momono S, *et al.* A case of jejunal vein thrombosis due to medroxyprogesterone acetate. *Gan To Kagaku Ryoho* 1992;**19**:2259–61.
- 4 Schwallie PG. Experience with Depo-provera as an injectable contraceptive. *J Reprod Med* 1974;**13**:113–7.
- 5 Zhi-hui L, Shou-jing F. Ischemic papillopathy and contraceptives. *Chin Med J* 1988;**101**(6):446–7.

MAILBOX

Age and cataract surgery complications

We read with interest Robbie *et al*'s article.¹ We agree with the authors that identification of risk factors for cataract surgery is important, as it has implications for patient care, surgical training, auditing and revalidation. The authors concluded that older age was not associated with an

increased risk of intraoperative complications. Complication rates in patients ≥ 88 years old were not significantly different to patients < 88 years (4.5% vs 6.3%, $p = 0.54$). Complication rates in patients ≥ 96 years was higher than in patients < 96 years but this was not statistically significant (11.1% vs 6.3%, $p = 0.45$). However, the study included only 54 patients older than 90 years (number of patients older than 88 years not stated) and 9 patients older than 96 years.

In a similar study, we identified all phacoemulsification cataract procedures carried out between 2001 and 2005 at the Southampton Eye Unit. Intraoperative complications, as classified in the National Cataract Surgery Survey,² were recorded on a computer database for each cataract procedure. We analysed the same data as the above study,¹ including age of patient, grade of surgeon and intraoperative complications (defined as abnormality in wound closure, posterior capsule tear, zonule dehiscence, anterior chamber haemorrhage, iris trauma or persistent iris prolapse).

Logistic regression analysis was carried out to examine whether patients aged ≥ 88 and aged ≥ 96 years were associated with an increased risk of complications. SPSS version 14 was used for statistical analysis; $p < 0.05$ was considered statistically significant.

We identified 9367 consecutive phacoemulsification procedures. The mean patient age was 76.9 (SD 9.8) years. The overall complication rate was 3.1%. No significant difference was found between grades of surgeon and complication rates (trainee vs consultant: 3.2% vs 3.1%, $p = 0.90$).

Interestingly, the complication rate in patients ≥ 88 years (837 eyes) was 4.3% compared to 3.0% in patients < 88 years (OR 1.4, 95% CI 1.005 to 2.049, $p < 0.05$). In patients ≥ 96 years (36 eyes), the complication rate was 8.3% compared to 3.1% in patients < 96 years (OR 2.8, 95% CI 0.858 to 9.228, $p = 0.09$).

Therefore, in contrast to the above study,¹ our results suggest that older age may be a risk factor for intraoperative complications during phacoemulsification surgery. We suggest that the rate of complications in cataract surgery in different age groups requires further study and that, in view of our results, experienced surgeons should preferentially operate on patients older than age 88 years.

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References

- 1 Robbie SJ, Muhtaseb M, Qureshi K, *et al.* Intraoperative complications of cataract surgery in the very old. *Br J Ophthalmol* 2006;**90**:1516–18.
- 2 Desai P, Minassian DC, Reidy A. National cataract surgery survey 1997–8: a report of the results of the clinical outcomes. *Br J Ophthalmol* 1999;**83**:1336–40.

Authors' response to Konstantopoulos *et al*

Editor

We thank Konstantopoulos *et al* for their interest in our paper and congratulate them for having conducted such a large study. It should be noted, however, that we did not actually conclude that older age was not associated with an increased risk of intraoperative complications,