The foveal reflection analyser is a device recently developed at our department.³ Healthy cones show a strong directional reflex towards the centre of the pupil, the so called "optical Stiles Crawford" effect. An FRA measurement provides a parameter rho as a quantitative measure of the cone directionality. In addition, it provides estimates of the densities of lens, macular pigment and melanin (not shown).

At initial presentation, rho was 0.00 (fig 2, left). Ten weeks later rho was 0.12, within normal limits. Visual acuity was 1.0 at that time. Twenty one weeks after the initial presentation, OCT (fig 1, bottom) and FRA (fig 2, right) were repeated, both with normal outcomes (rho 0.12). Visual acuity had not changed.

Comment

The foveal reflection analyser that measures the cone specific optical Stiles Crawford effect in a fast and patient friendly way, indicates that in MEWDS the cones are temporarily in disarray, but regain their original orientation in a matter of weeks. This is in agreement with OCT findings, where a transient disruption of the foveal photoreceptor outer segments is seen. In conclusion, this case demonstrates the usefulness of the new, sensitive FRA technique, in studying small, central visual defects, not discernible on full field ERG, in places where multifocal ERG is not available. In such cases OCT is also helpful.

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References

- 1 Jampol LM, Sieving PA, Pugh D, *et al*. Multiple evanescent white dot syndrome. I. Clinical findings. *Arch Ophthalmol* 1984;102:671-5.
- 2 Sieving PA, Fishman GA, Jampol LM, *et al*. Multiple evanescent white dot syndrome. II. Electrophysiology of the photoreceptors during retinal pigment epithelial disease. *Arch Ophthalmol* 1984;102:675-9.
- 3 Zagers NPA, van de Kraats J, Berendschot TJM, *et al*. Simultaneous measurement of foveal spectral reflectance and cone photoreceptor directionality. *Appl Opt* 2002;41:4686-96.
- 4 Schuman JS, Puliafito CA, Fujimoto JG. *Optical coherence tomography of ocular diseases*, 2nd ed. Thorofare, NJ: Slack Incorporated, 2004:24-5.

PVR as a complication of rhegmatogenous retinal detachment: a solved problem?

Proliferative vitreoretinopathy (PVR) is a common cause of blindness after buckling procedures and after primary vitrectomy.¹ PVR occurs in 10% of eyes after rhegmatogenous retinal detachment.² Re-detachment is seen mostly within the first 6-8 weeks after surgery. Efforts to reduce the risk of PVR include trying to reduce the surgical trauma, early surgery, and lower thresholds to use silicone oil or retinotomies, pharmaceutical adjuncts, as well as improvements in surgical technique during recent years.³

Surgeons are under the impression that the burden of PVR has lessened over recent decades. This is hypothetically attributable to a change in the surgical technique (for example, more primary vitrectomy instead of scleral buckling). To test this hypothesis, we have retrospectively analysed all patients who underwent primary surgery for rhegmatogenous retinal detachment in 1988 at the University of Cologne and compared the results to the patients operated on in 2003 in the same location. The follow up for eventual re-operations was 1 year in both instances.

In a second step, all vitreoretinal operations, including those for retinal detachment and other indications, were counted in 1988 and 2003 to analyse whether the total number of operations changed compared to the number of re-operations.

Case series

In 1988, a total of 197 eyes were operated for rhegmatogenous retinal detachment (fig 1A); 187 (95%, 187/197) of them were treated by buckling surgery. Out of these, re-detachment occurred in 21 of the cases during 1 year of follow up (11.2%, 21/187). Primary vitrectomy combined with buckling surgery was performed in only 10 patients. Out of those, three (33%, 3/10) needed re-operation for retinal re-detachment.

In 2003, in contrast, 157 of 217 eyes (72%) underwent primary PPV and buckling surgery (fig 1B). In 13 of these cases (8.3%, 13/157) re-detachment of the retina was seen. Primary buckle without PPV was chosen for 60 eyes in 2003. Re-detachment occurred in 17 eyes (28.3%, 17/60).

PVR, seen as star fold and membrane formation and defined as anterior and

posterior PVR grade C leading to re-detachment, was responsible for the described re-detachment in three of 60 cases (5%) after buckling surgery in 2003 compared to 12 of 157 eyes (7.6%) after primary PPV and buckle. Thirteen of 187 cases (7%) operated with buckling surgery in 1988 showed PVR induced re-detachment compared to three of 10 eyes (30%) after primary PPV and buckle. This high rate of PVR re-detachments after primary PPV and buckle in 1988 could probably be explained by the fact that these were more complicated cases, which required the, in 1988, uncommon need for primary PPV in rhegmatogenous retinal detachment. Beside this, the number of PVR induced re-detachment after primary operation for rhegmatogenous retinal detachment in 2003 did not decrease compared to 1988.

Nevertheless, the total number of re-detachments is a little lower after primary PPV in 2003, with 8.3% (13/157) compared to 11.2% (21/187) in 1988 after buckling surgery alone (fig 1).

But why do surgeons have the subjective impression of a lower rate of PVR in everyday practice? To answer this question, we recorded all vitreoretinal operations, including those for rhegmatogenous retinal detachment, which are described above, but also those for other indications. While surgery for retinal detachment still remains the number one indication for surgery, the spectrum of diseases approached by vitreoretinal surgery widened during the past decade with increasing numbers of surgery for macular diseases (for example, macular pucker, macular hole, age related macular degeneration) (fig 2). Ocular trauma as a significant source of PVR complication is reduced. The more conscious use of protective eyewear and the seatbelt legislation have led to a reduction in cases with severe ocular trauma and intraocular foreign bodies in 2003 compared to 1988. There are fewer patients with severe ocular trauma in which PVR development is a frequent complication.²

In both years, re-vitrectomy was necessary in nearly an equal number of eyes (18% (146/813) of all performed operations in 2003 compared to 23.3% (161/692) in 1988). This included reoperations because of PVR induced re-detachment and re-detachment without PVR, but also re-vitrectomy because of macular pucker formation and others. Interestingly, in 2003, the indication for re-vitrectomy more frequently included macular pucker formation (fig 2).

Figure 1 Primary operations for rhegmatogenous retinal detachment in 1988 (A) and 2003 (B) and required re-operations because of re-detachment with or without PVR.

Figure 2 All vitreoretinal operations performed in Cologne in the years 1988 (n = 692) and 2003 (n = 813).

Comment

In summary, our data do not confirm the subjective impression of an improved rate of PVR in rhegmatogenous detachment in 2003 compared to 1988. The impression that PVR today is a decreasing problem may be explained by proportionally fewer interventions for PVR. The total number of operations and the number of new indications for surgery have grown, while ocular trauma and its PVR complication decreased.

Our results are supported by the SPR study,⁴ showing that primary vitrectomy did not reduce the risk of PVR over buckling. Our study is restricted by the limitations of a retrospective study. We also did not distinguish between phakic and pseudophakic eyes.

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References

- Heimann H, Zou X, Jandek C, et al. Primary vitrectomy for rhegmatogenous retinal detachment: an analysis of 512 cases. *Graefes Arch Clin Exp Ophthalmol* 2005;26:1-10.
- Cardillo JA, Stout JT, LaBree L, et al. Post-traumatic proliferative vitreoretinopathy. The epidemiologic profile, onset, risk factors, and visual outcome. *Ophthalmology* 1997;104:1166-73.
- Kirchhof B. Strategies to influence PVR development. *Graefes Arch Clin Exp Ophthalmol* 2004;242:699-703.
- SPR Study Group. Oral presentation at the SOE Meeting Berlin, September 2005. (Publication forthcoming).

Pupillary block glaucoma in phakic perfluoropropane gas filled eye

Gas is widely used in vitreoretinal surgery. It is a valuable tool to treat difficult retinal detachments and severe cases of proliferative vitreous retinopathy.¹ Gas mediated pupillary block and iridocorneal apposition are known complications in aphakic eyes that underwent vitreoretinal surgery.²⁻⁴ We report a case of a phakic patient with an acute pupillary block glaucoma related to the migration of perfluoropropane (C_3F_8) into the anterior chamber. We are unaware of previous reports on this complication, and a Medline search found no literature on this topic.

Case report

A 46 year old man underwent a pars plana vitrectomy with 15% C_3F_8 (perfluoropropane) injection to his right eye for a macula on recurrent rhegmatogenous retinal detachment. There was no history of trauma. During discharge on the first postoperative day, the anterior chamber was deep and there were no signs of pseudoexfoliation, lental

dislocation, or zonule defects. Intraocular pressure (IOP) was 19 mm Hg. Five days later, the patient came to the outpatient department with acute pupillary block glaucoma secondary to a gas bubble between the iris and crystalline lens causing iridocorneal apposition (fig 1A). The IOP was 37 mm Hg. Topical and systemic antiglaucoma medications were started. The patient was maintained in a strict prone position. Two hours later, the gas bubble reduced in size because most of the bubble moved behind the crystalline lens (fig 1B). However, the IOP remained high and the iridocorneal apposition did not break down. An inferior Nd:YAG laser peripheral iridotomy at 6 o'clock was performed. It resulted in the immediate deepening of the anterior chamber and reduction in IOP to 16 mm Hg with no recurrence of the pupillary attack (fig 2). Six weeks after surgery, the anterior chamber was deep and the IOP was 17 mm Hg with no antiglaucoma medications.

Comment

Complete iridocorneal apposition is a known complication in aphakic eyes that undergo vitrectomy followed by intraocular gas injection.²⁻⁵ The incidence of this condition was estimated to be 3% in a retrospective study of 336 aphakic eyes.³ Buoyant forces from the bubble and pupillary block combine to push the iris forward onto the posterior surface of the cornea. This results in complete iridocorneal apposition. To the best of our knowledge, we report the first case of a phakic patient who developed an acute pupillary block glaucoma related to migration of C_3F_8 into the anterior chamber.

Zonulysis is the pathological change that allows a migration from the posterior into the anterior chamber. Such changes are usually seen after trauma or in cases of weak zonules such as in pseudoexfoliation. Our patient did not report any trauma nor did he have pseudoexfoliation. However, the superior part of the zonules might have been compromised by previous retinal surgery.

Initially, our patient maintained a good prone positioning and encountered no problems; however, as he did not keep to the position, this probably resulted in the pupillary block by migration of C_3F_8 into the anterior chamber, thus pushing the iris diaphragm anteriorly. In our patient, Nd:YAG laser iridotomy at 6 o'clock was sufficient to treat the pupillary block. A permanent iridocorneal apposition did not occur because of early recognition and intervention.

Figure 1 (A) Clinical photograph demonstrates C_3F_8 gas bubble blocking the pupil. Note the complete iridocorneal apposition. (B) Clinical photograph demonstrates the remnant of the gas bubble after 2 hours from strict face down position. Complete iridocorneal apposition still exists.