Delayed removal of Malyugin ring following phacoemulsification complicated by suprachoroidal hemorrhage

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We report a case in which a Malyugin ring was left in the eye for 1 week after phacoemulsification complicated by an intraoperative suprachoroidal hemorrhage. The suprachoroidal hemorrhage resolved within a few days. One week postoperatively, an intraocular lens was implanted in the capsular bag and the Malyugin ring was removed uneventfully. One month after the secondary procedure, the uncorrected distance visual acuity was 0.1 logMAR (6/7.5 Snellen). The case shows that a Malyugin ring can be left in the eye safely for a week in cases of intraoperative suprachoroidal hemorrhage. It is an example of an unintended benefit of a pupil-dilating device. To our knowledge, this is the first report of this occurrence.

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Several pupil-dilating devices (or pupil expanders) are available to assist cataract surgeons with phacoemulsification and intraocular lens (IOL) implantation in patients with small pupils. One such device is the Malyugin ring. The ring is normally placed in the anterior chamber, which is prefilled with an ophthalmic viscosurgical device (OVD) through a clear corneal incision (CCI). It is attached to the pupillary border at 4 points, stretching the pupil evenly. The pupil remains round and free from anterior or posterior bowing.

Suprachoroidal hemorrhage is a rare, serious complication of intraocular surgery. The incidence of suprachoroidal hemorrhage associated with cataract surgery is between 0.04% and 0.1%. If this complication occurs intraoperatively, the cataract surgery is usually abandoned and completed at a later date.

CASE REPORT

An 87-year-old white man had elective phacoemulsification in the right eye under sub-Tenon local anesthesia. The medical history included controlled systemic hypertension, peripheral vascular disease, and hypercholesterolemia. The preoperative corrected distance visual acuity (CDVA) in the right eye was 0.52 logMAR (~6/19 Snellen). The axial length of the eye was 25.15 mm. The pupils were round and of equal size. Because the right pupil dilated poorly with our standard preoperative topical treatment, a 7.00 mm Malyugin ring (Microsurgical Technology) was used. A 2-step temporal CCI was made with a 2.60 mm keratome. Two paracenteses were made at 90 degrees to the corneal incision. The OVD hydroxypropyl methylcellulose (MoorVisc HPMC 2%) was used to fill the anterior chamber. A continuous curvilinear capsulorhexis was created with a cystotome, and hydrodissection was carried out using a balanced salt solution. Phacoemulsification was performed uneventfully using the Whitestar Signature Phacoemulsification System with Ellips FX Technology (Abbott Laboratories, Inc.). During irrigation/aspiration (I/A) with a Simcoe cannula, the eye became firm and the anterior chamber shallowed. No vitreous was lost. Further surgery was abandoned, and the Malyugin ring was left in the eye (Figure 1). Temporal iris was adherent to the main corneal incision. Some residual soft lens matter was retained in the eye, and some OVD was left in the anterior chamber. Intracameral cefuroxime 1.0 mg (Aprokam) was administered.

On the first day postoperatively, the anterior chamber was fully formed and deep. There was extensive corneal edema and anterior chamber inflammation. Residual soft lens matter was present in the anterior chamber. B-scan ultrasonography revealed a right temporal suprachoroidal hemorrhage...
Postoperative treatment included oral acetazolamide (Diamox SR), oral ciprofloxacin, a topical beta-blocker (timolol 0.25%), dexamethasone 0.1%, and chloramphenicol 0.5%.

At 1 and 2 days, the uncorrected distance visual acuity (UDVA) was hand motion only. The intraocular pressure (IOP) was 29 mm Hg and 19 mm Hg at 1 day and 2 days, respectively. At 2 days, a repeat B-scan showed a significant reduction in the suprachoroidal hemorrhage.

One week later, an elective secondary procedure was performed under general anesthesia. Irrigation/aspiration was performed using the preexisting ports. A single-piece hydrophobic acrylic IOL (Tecnis ZCB00, Abbott Medical Optics, Inc.) was implanted in the capsular bag, and the Malyugin ring was removed. Intracameral cefuroxime 1.0 mg was administered.

One week later, the CDVA was 1.06 logMAR (~6/75). At that time, marked corneal edema was noted, with a deep anterior chamber. The retina was flat on fundoscopy and on a repeat B-scan. Treatment continued with topical ketorolac tromethamine 0.5% (Acular) and dexamethasone 0.1%.

Four weeks later, the UDVA was 0.1 logMAR (6/7.5). At the most recent examination (8 months after the last operation), a slight irregularity of the right pupillary margin was noted (Figure 3); it was also noted that the right pupil was slightly larger than the left pupil (Figure 4).

DISCUSSION

To our knowledge, this is the first report of a Malyugin ring retained in the eye for 7 days in a case of phacoemulsification complicated by suprachoroidal hemorrhage. Although trauma to the sphincter pupillae resulted in distortion of the right pupillary margin and anisocoria, the case shows that a Malyugin ring can remain in the eye safely for several days after a complication occurs. It also shows that with careful postoperative monitoring and rigorous management of intraocular inflammation, corneal edema, and elevated IOP, it is possible to recover visual acuity.

Although our case involved a limited temporal suprachoroidal hemorrhage, it may be possible to...
leave a Malyugin ring in the eye following more extensive suprachoroidal hemorrhage or other unforeseen circumstances that require postponing of phacoemulsification. However, if the anterior chamber is persistently shallow and cannot be reformed with heavy OVDs, surgical drainage of choroidal hemorrhage has been reported to be effective.\(^4\) We believe that for other complications of phacoemulsification, such as posterior capsule rupture or posterior displacement of nuclear fragments requiring a vitreoretinal procedure within a few days, a Malyugin ring can be left in the eye until the procedure can be performed.

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