

Improving the Iris' Behavior

Healon 5 has positive effects in cataract surgery patients who have a history of Flomax use.

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Healon 5 (Advanced Medical Optics, Inc., Santa Ana, CA) is a retentive viscoadaptive agent with a high molecular weight that has both dispersive and cohesive properties. Because of this ophthalmic viscosurgical device's (OVD) capability to cause viscomydriasis and add pseudotonia by mechanically displacing and immobilizing the iris, we undertook a study to determine whether Healon 5 can widen and maintain pupillary dilatation, improve the iris' behavior, and reduce the complication rate in patients using Flomax (Boehringer-Ingelheim Pharmaceuticals, Inc., Ridgefield, CT).¹

When Chang and Campbell² first reported that intraoperative floppy iris syndrome (IFIS) is associated with Flomax, they encountered a 12.5% incidence of torn posterior capsules. Suboptimal pupillary dilatation, a billowing iris, and a constricting pupil characterized these cases. According to the literature, a suboptimal pupil is conducive to intraoperative complications in patients with pseudoexfoliation syndrome.³ It is likely that the pupil's behavior contributes to the difficulties encountered by the surgeon performing cataract surgery on an eye with IFIS.

STUDY: CATARACT SURGERY IN FLOMAX PATIENTS

We evaluated 25 eyes of 19 patients with a history of Flomax use who underwent cataract surgery. We used a retrospective video review to evaluate the effect of using Healon 5 on viscomydriasis, the suppression of billowing and prolapse of the iris, intraoperative and postoperative complications, and early, uncorrected vision after surgery. Viscomydriasis occurred consistently and ranged from mild to dramatic (1 to 3mm)

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dilatation. The average diameter of the pupil before the administration of Healon 5 was 5.82mm, which increased to 7.21mm after the viscoelastic's injection. Injecting additional Healon 5 could reverse pupillary constriction. Both billowing and prolapse of the iris were markedly improved by the use of slow-motion phaco parameters.⁴ Complications were rare—one torn posterior capsule and one significantly bruised iris. On postoperative day 1, 23 eyes (92%) achieved a UCVA of 20/40 or better.

THE EFFECTS OF HEALON 5

Viscomydriasis

We have found that Healon 5 produces excellent viscomydriasis by its mechanical dilatation of the pupil while it adds "tone" to the floppy iris in virtually every case.⁵ Injecting enough Healon 5 to create a concave configuration to the iris widens the pupil and markedly reduces billowing of the iris. As soon as the Healon 5 escapes or is removed, however, a marked change in the iris' behavior occurs, including pupillary constriction, dramatic shimmering, and billowing.

Iris Prolapse

The tendency for iris prolapse also diminishes when Healon 5 is present in the anterior chamber. Because

the atonic iris is sensitive to any pressure gradient, the iris seeks the aspiration port or the incision (or both). Initially, injecting Healon 5 directly onto the subincisional iris displaces it away from the incision and prevents the iris from leaping into the incision as the viscoelastic fills the remainder of the anterior chamber. In only three cases (12%), the iris actually prolapsed into the incision at the beginning of the surgery. We managed these cases by aspirating Healon 5 to lower the IOP with a 25-gauge cannula inserted through the stab incision. Then, we could sweep the iris out of the main incision with the same cannula. After repositioning the iris, we re-injected Healon 5 onto the subincisional iris until it became concave. We could then introduce a bent, 22-gauge needle for the capsulorhexis.

Capsulorhexis

Healon 5 reduces the tendency for the edge of the capsulorhexis to extend toward the periphery, because it flattens the anterior curvature of the lens' dome. By slowing the speed of the capsulorhexis, Healon 5 enhanced the surgeon's control of the tear. If the ophthalmologist prefers to perform a quicker capsulorhexis, a forceps is more effective than a bent needle. Regardless of the device selected, the wider pupil and the deeper chamber afforded by the Healon 5 are more conducive to a successful capsulorhexis in IFIS. Hydrodissection and hydrodelineation may flush out some of the Healon 5. Refilling the chamber is recommended by Dr. Osher, because diluted or fractured Healon 5 will not maintain the pupil's size or retard billowing of the iris as well as replacing the OVD. If the fluid wave causes the iris to move visibly toward the incision, it is easier to insert the phaco tip without irrigation. Once the tip is inside the anterior chamber, irrigation can be safely initiated.

Phacoemulsification

Slow-motion phacoemulsification using low parameters and a low bottle height has proven effective in retaining OVDs.⁵ The emulsification of the nucleus begins with the embedding of the ultrasound tip bevel down into the anterior cortex. Only lenticular material can be removed when the bevel is down. Raising the vacuum to 250mmHg should prevent obstruction of the tip and thus avoid thermal consequences. As soon as a groove or divot appears in the lens, the surgeon may reduce the vacuum to 40mmHg and rotate the bevel upward to allow precise sculpting and deepening of the groove in the nucleus while the overlying Healon 5 is undisturbed. Next, the surgeon divides the nucleus into hemispheres and chops it into quadrants

while raising the vacuum to 180mmHg for complete nuclear removal. Healon 5 may be re-injected for additional pupillary dilatation or for the posterior displacement of the iris. Certainly, lower levels of vacuum and flow require less infusion pressure, which further reduces billowing and prolapse of the iris.

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Cortical Removal and Vacuuming the Posterior Capsule

Although it is possible to retain the OVD during cortical removal, the Healon 5 is easily engaged and aspirated when the vacuum is set at 400mmHg. Therefore, the surgeon should depress the foot switch only when the port is embedded in the most proximal anterior cortex. During cortical stripping within the bag, the surgeon must release the foot pedal the instant the cortex disappears into the port of the I/A tip. It is less important to keep the OVD in the eye if vacuuming the central posterior capsule, because pupillary dilatation is not critical for this step. Moreover, the low vacuum and bottle height are less conducive to iris prolapse. Re-injecting Healon 5 to replace the subincisional iris before refilling the capsular bag should precede the injection of the IOL. The viscomydriasis will reveal the edge of the capsulorhexis while confirming that the cortex has been completely removed.

IOLs

Healon 5 facilitates the implantation of a single-piece acrylic IOL, because the haptics remain folded, simplifying the lens' placement and maneuverability. Healon 5 also absorbs the kinetic energy of an unfolding three-piece silicone or acrylic lens.

Posterior Capsular Rupture and Tear

In contrast to the Chang and Campbell study, which reported a 12.5% incidence of posterior capsular rupture, we encountered this complication in only one eye (4%). In this case, the surgeon neglected to refill the anterior chamber with Healon 5 during the phacoemulsification, and the pupil constricted to 3mm. A peripheral tear was identified during the removal of the Healon 5

after the IOL had been placed into the bag. Even after reviewing the video, we do not know how and when the tear in the posterior capsule occurred. The surgeon performed a brief anterior vitrectomy “dry” beneath Healon 5, and the IOL remained well centered within the capsular bag. This patient attained a UCVA of 20/25 on the first day following the vitrectomy.

POSTOPERATIVE OUTCOMES AND ACTIONS Complications

Postoperative complications were infrequent. Only one patient had a cosmetic iris bruise measuring 2mm in diameter as a result of intraoperative iris prolapse. Three (12%) eyes had an IOP of between 30 and 35mmHg on the first postoperative day, and they were treated with a topical beta-blocker, a prostaglandin inhibitor, and a carbonic anhydrase inhibitor. All IOPs were normal at the 1-week visit, and no patient experienced any pressure-related consequences. Because the IOP can rise in any eye with residual OVD within the chamber, we attempted to remove the Healon 5 completely in every case by means of a two-compartment technique described by Manfred Tetz, MD.⁶ When the vacuum is 450mmHg, it is possible to aspirate Healon 5 rapidly and completely because of its cohesive behavior at high sheering rates.

Administration of Additional Drug Therapies

During the OVD’s removal, the dramatic billowing of the iris serves as a reminder that IFIS is present. Intra-cameral acetylcholine chloride seems to have an exaggerated effect of rapidly constricting the pupil, which further minimizes the risk of iris prolapse. We routinely instill a drop of pilocarpine and brimonidine at the conclusion of surgery as prophylaxis against an increase in IOP. Some patients also receive latanoprost, timolol, or even oral acetazolamide when they have a history of glaucoma, ocular hypertension, pigment dispersion syndrome, pseudoexfoliation, or trauma or if they have a positive family history of glaucoma.

By the 1-week postoperative visit, all eyes had an UCVA of 20/40 or better. Although one patient experienced an intraoperative complication of a torn posterior capsule, no patient in our series developed a significant postoperative complication such as prolonged corneal edema, persistent iritis, infection, cystoid macular edema, glaucoma, or retinal tear/detachment.

CONCLUSION

By mechanically widening the pupil and by reducing the tendency for the iris to prolapse and billow, Healon 5 appears to be an ideal OVD for managing IFIS in the patient with a history of using Flomax.

Although the added difficulty of operating on patients with IFIS cannot be underestimated, we have achieved excellent surgical outcomes by performing meticulous slow-motion phacoemulsification and using Healon 5. ■

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1. Osher RH, Barros MG, Marques DM, et al. Early uncorrected visual acuity as a measurement of the visual outcomes of contemporary cataract surgery. *J Cataract Refract Surg.* 2004;30:1917-1920.
2. Chang DF, Campbell JR. Intraoperative floppy iris syndrome associated with tamsulosin. *J Cataract Refract Surg.* 2005;31:664-673.
3. Hyams M, Mathalone N, Herskovitz M, et al. Intraoperative complications of phacoemulsification in eyes with and without pseudoexfoliation. *J Cataract Refract Surg.* 2005;31:1002-1005.
4. Osher RH, Marques DM, Marques FF, Osher JM. Slow-motion phacoemulsification technique. *Techniques in Ophthalmology.* 2003;1:73-79.
5. Osher RH. Healon 5 in IFIS. *Video Journal of Cataract and Refractive Surgery.* 2005;21(2).
6. Tetz MR. Two-compartment technique to remove ophthalmic viscosurgical devices. *J Cataract Refract Surg.* 2000;26:641-643.

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