New Techniques for the Management of Intraoperative Floppy Iris Syndrome (IFIS)

Howard Fine, MD,
Richard S. Hoffman, MD,
Mark Packer, MD, FACS

Drs. Fine and Packer are consultants to Advanced Medical Optics, Inc., and Bausch & Lomb, Inc. Dr. Fine has received research and travel support from Alcon, Inc., STAAR Surgical, eyeonics, and Rayner IOL. Dr. Packer has received travel support and honoraria from Alcon, Inc., and STAAR Surgical, Inc. Dr. Hoffman has no financial interests.

Abstract

New techniques for the management of Intraoperative Floppy Iris Syndrome (IFIS) secondary to Flomax use are discussed. These techniques include the use of the bimanual microincision phacoemulsification technique, Healon 5, coaxial phacoemulsification with Morcher Pupil Expander Rings, and pars plana transcleral vitrectomy prior to phacoemulsification in cases of extremely shallow anterior chambers. Also discussed are methods for phacoemulsification in the presence of inadequate hydrodissection and hydrodelineation due to the tendency for the iris to prolapse during the hydrosteps in IFIS. These techniques have allowed the authors to reduce their complication rate to normal levels and to almost eliminate iris damage.Intraoperative Floppy Iris Syndrome (IFIS) has presented new challenges to cataract surgeons. Over a short period of time, we have learned a variety of new tricks for managing this challenge.

As advised by Sam Masket, MD, we do not discontinue Flomax, but have the patients instill 1% atropine drops QID for a week pre-operatively. At the time of surgery, we never stretch the pupil because that seems to exacerbate the tendency for the iris to be floppy and to prolapse.

Bimanual microincision phacoemulsification in the case of soft or moderate nuclear densities is quite advantageous because the small size of the incisions makes it less likely that the iris will actually prolapse if it comes to the incision. Cortical cleaving hydrodissection and hydrodelineation are performed and then the lens is hydroexpressed into the plane of the iris. The unsleeved phaco needle in the right-hand incision with the bevel turned toward the cataract, and the irrigator in the left hand, sitting high in the anterior chamber above the lens are used. The lens itself keeps the iris back and the fact that the irrigation is anterior to the iris tends to keep the iris taught and prevents it from billowing. Using very little ultrasound energy and high vacuum, the endonucleus is removed while carouselling the nuclear complex in the plane of the iris. At the completion of the removal of the endonucleus, one can see how the iris was held back by the remaining epinuclear shell (Figure 1). That is then removed by the phacoemulsification needle while the anteriorly positioned irrigator keeps the iris taught and posteriorly located so that it cannot billow with a constriction of the pupil.

The use of Healon 5 is very advantageous for bimanual phacoemulsification of harder nuclei. The pupil is manually dilated with the Healon 5 and a slightly larger capsulorhexis is performed. We do one endolenticular horizontal chop, and then we keep the irrigating chopper high in the anterior chamber throughout the remainder of the phacoemulsification procedure, mobilizing nuclear material from the endolenticular space and bringing it up the chopper for further disassembly. We try to keep the phaco tip occluded as much as possible, and if there is a clearance of occlusion, we try to go directly to foot position one rather than two to avoid evacuating Healon 5 from the eye. The irrigating chopper high in the anterior chamber allows fluid from it to press against the iris and keep it retroplaced disallowing billowing or floppiness of the iris and helping to maintain pupillary dilation. It is very easy to mobilize nuclear material with a bevel-down tip from the endolenticular space. We then will evacuate the epinucleus in the usual form and throughout the procedure we do lose some Healon 5 and as a result the pupil will come down some, but the iris will never be allowed to billow or become floppy.

Following the completion of phacoemulsification, we will once again maximally dilate the pupil with Healon 5. To avoid mobilizing Healon 5 during cortical cleanup, the aspirator is used in a circumferential pattern along the capsulorhexis evacuating cortical material from the capsular fornices without allowing a clearance of occlusion. Once again, the anterior position of the irrigator was advantageous for maintaining a retroplaced iris and disallowing billowing or floppiness of the iris with concomitant constriction. We end up with a very good-looking iris, free from any trauma.

The use of the Morcher Pupil Expander Ring (Type 5S, FCI Ophthalmics, Marshfield Hills, MA) is extremely advantageous in conjunction with coaxial phacoemulsification. The ring is made of polymethyl methacrylate (PMMA) and is 1mm tall with flanges, which contain positioning holes for the adjustment of its position. The ring can be inserted through a 2.5mm incision with an injection system (Geuder Pupil Dilator Injector, #G-32970, FCI Ophthalmics, Marshfield Hills, MA) so that the flanges engage the pupil as it is being introduced. The ring is introduced following incision construction and filling of the anterior chamber with a dispersive viscoelastic. The position of the pupil can actually be adjusted by adjusting the position of the ring. With the ring in place, capsulorhexis, the hydrosteps, phacoemulsification, cortical clean-up, and intraocular lens implantation are performed. Prior to removing the viscoelastic, the ring is disengaged from the pupil and moved to the extreme right side of the anterior chamber with the leading edge of the open portion of the ring directly confronting the incision (Figure 2). The injection instrument can then be placed back into the incision and the hook in the injection system can engage the leading eyelet and draw the ring back into the injector by the spring-loaded plunger (Figure 3). If the ring enters the injector at an angle, a piece of the leading positioning hole will snap off leaving the surgeon with a disadvantageous circumstance of a transparent intraocular foreign body, so it is very important to properly position the ring prior to removing it with the injector. However, the use of the injector for the removal of the ring dramatically reduces the potential for any injury to intraocular contents or to the incision itself.

In the disadvantageous set of circumstances in which one is confronted with a small pupil from Flomax, pseudoexfoliation, and extremely shallow anterior chamber, we have found it preferable to do a pars plana, transcleral, 25 gauge vitrectomy (25 Gauge High Speed Vitrectomy cutter tip, Bausch & Lomb, San Dimas, CA, #CX 5825) as an initial step in the operation (Figure 4). This deepens the chamber, facilitates retroplacement of the iris, and creates adequate room for further manipulations. One has to maintain tactile feedback of the softness of the eye as this high-speed vitrector can overly soften the eye, which can retroplace the lens enough to challenge further the already weakened zonular apparatus. Following the completion of the transcleral vitrectomy, the conjunctival and scleral incisions do not need to be sutured. The anterior chamber is then filled with viscoelastic, the pupil expander ring is injected, and capsulorhexis is performed. Gentle cortical cleaving hydrodissection is performed to facilitate later cortical clean-up. A capsular tension ring is then injected into the capsular fornix to stabilize the lens during the extraction procedure and to provide some additional long-term centration of the IOL. Horizontal chopping is preferred because it avoids downward pressure on the lens which could challenge the weakened zonules.

It is very important that one be aggressive during cortical clean-up in the presence of a capsular tension ring because there can be substantial amounts of cortex hidden from view. Going behind the iris with an aspirator and stripping cortex circumferentially, rather than centrally, vastly facilitates the removal of the cortex from around the ring, rather than trapping the capsular tension ring by engaging the anterior and posterior leaf of the cortex and stripping centrally. The use of cortical cleaving hydrodissection just prior to the introduction to the capsular tension ring is very beneficial for later removal of the cortex.

In IFIS, hydrodissection and hydrodelineation are difficult because of the tendency for the iris to prolapse out of the eye. In cases in which there is inadequate hydrodissection and hydrodelineation, rotation of the cataract may not be possible. We can do vertical chopping to create very thin, small pie-shaped segments distally. With the removal of three or four distal pie-shaped segments, enough room within the capsular bag has been created so that rotation can then be done. This allows chopping circumferentially, after which the epinucleus can be flipped and mobilized.

In cases in which there is no opportunity to perform hydrodissection or hydrodelineation because of the tendency of the iris to prolapse, one can bowl out a small portion of the central endonucleus and then do hydrodelineation from inside-out (Figure 5) as first described by Abhay Vasavada, MD, for hard cataracts. This will result in an ability to then rotate the endonucleus and then chop the residual endonuclear bowl in the usual manner. One can then flip the epinucleus in the usual manner.

On occasion, with coaxial phacoemulsification it can be very advantageous to remove subincisional cortex by using a small 1.1mm paracentesis from the side of the eye opposite the incision for microincision aspirator while utilizing the coaxial handpiece as the irrigator to hold the iris back in the subincisional area (Figure 6). This has been a useful trick for us in a variety of cases.

It is important in floppy irides that the cartridge of the injection system for IOL implantation be turned bevel-up as it is introduced into the incision in order to not allow prolapse of iris into the cartridge. The cartridge is turned bevel-down to deliver the lens as usual, but after the lens is in the bag, it is turned bevel-up again so that it acts as a shoe-horn as it exits the eye and doesn't allow the iris to prolapse either into the cartridge or out of the eye (Figure 7).

These maneuvers are easily performed by all phaco surgeons. They reduce the challenges and the complications1 operating on Flomax patients.Figure Legends

References

1. Chang DF, Campbell JR. Intraoperative floppy iris syndrome associated with tamsulosin. J Cataract Refract Surg. 2005 Apr; 31(4):664-73.
2. Personal communication with Samuel Masket, MD.
3. Fine IH, Hoffman RS. Phacoemulsification in the presence of pseudoexfoliation: Challenges and options. J Cataract Refract Surg March 1997; 23(2):160-165.
4. Vasavada, AR, Raj, SM. Inside-out delineation. J Cataract Refract Surg June 2004; 30(6): 1167-1169.

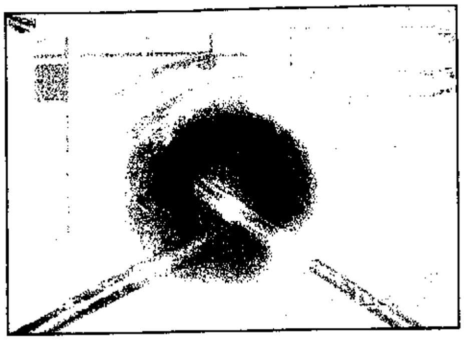

Figure 1: The epinuclear shell holds the iris back, keeping it in an adequately dilated state.

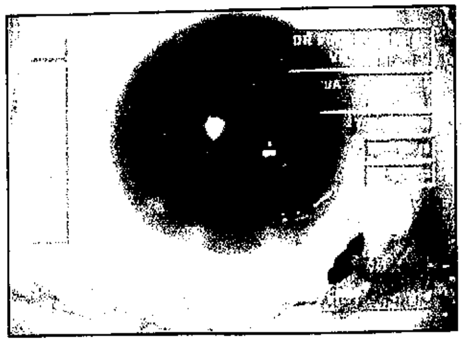

Figure 2: The Morcher Pupil Expander Ring perfectly positioned for retrieval out of the eye with the injector.

Figure 3: The Morcher Pupil Expander Ring is removed from the eye with the injector.

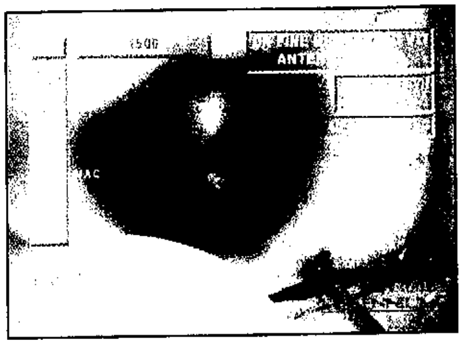

Figure 4: Pars plana transcleral 25g. vitrectomy prior to commencing cataract surgery in a patient with pseudoexfoliation, floppy iris syndrome and a very shallow anterior chamber. Tactile feedback of the softening of the eye is evidenced by the fingers shown in the illustration.

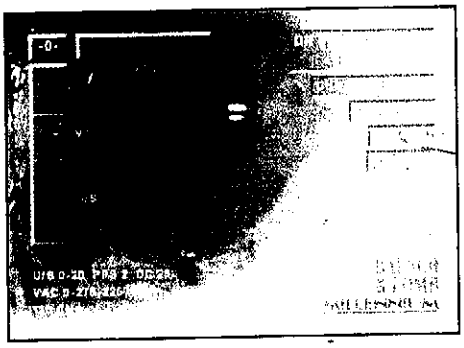

Figure 5:Inside-out hydrodelineation following bowling-out of the central portion of the endonucleus in a case in which no hydrodissection or hydrodelineation had previously been performed.

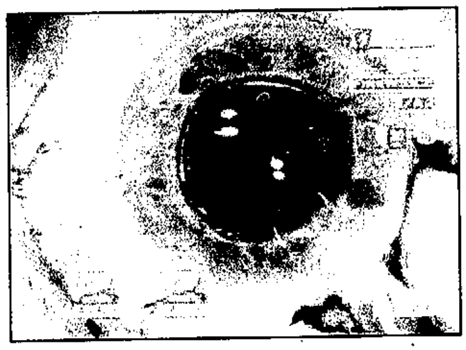

Figure 6:Subincisional cortex is removed with a microincision aspirator while the iris is held back with coaxial irrigator.

Figure 7: Bevel-up withdrawal of the cartridge following injecting of an intraocular lens into the capsular bag. References