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Managing IFIS With OZil Torsional Ultrasound





OZil Torsional ultrasound and INTREPID fluidics give surgeons greater confidence with these challenging cases.

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FLUIDIC CONTROL IN CHALLENGING EYES

Intraocular floppy iris syndrome (IFIS)[1] is an ongoing challenge for cataract surgeons. Overall, popularity is growing for 5-alpha reductase inhibitor drugs and other less receptor-specific treatments prescribed for benign prostatic hyperplasia. There are now reports that these medications can cause IFIS even when discontinued in years prior to cataract surgery and/or when used for a short amount of time.[2] Fortunately, cataract surgeons have a new arsenal of devices to help them manage floppy irises and minimize surgical risk. For phacoemulsification, the OZil Torsional handpiece and the INTREPID Fluidic Management System, available on the INFINITI Vision System (Alcon Laboratories, Inc., Fort Worth, TX), deliver increased followability and reduced intraocular turbulence, thereby making these cases easier to manage. Here, four surgeons with solid experience operating on IFIS eyes describe how OZil Torsional ultrasound helps to minimize the difficulty of these cases. After reading these descriptions, please visit Eyetube.net (http://www.eyetube.net/v.asp?wadava) to view each surgeon performing an IFIS cataract case.

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1. Chang DF, Campbell JR. Intraoperative floppy iris syndrome associated with tamsulosin. J Cataract Refract Surg. 2005;31:664-673.
2. Michel M, Okutsu H, Noguchi Y, et al. In vivo studies on the effects of alpha1-adrenoceptor antagonists on pupil diameter and urethral tone in rabbits. Naunyn Schmiedebergs Arch Pharmacol. 2006;372:346-353.

Less Is More With Torsional Phacoemulsification

OZil: Less phaco power needed means fewer surgical problems.

BY RICHARD TIPPERMAN, MD

Intraoperative floppy iris syndrome (IFIS) is a well-documented phenomenon that complicates cataract surgery. The main consequence of a floppy iris is that the pupil billows and could get drawn into the I/A or phaco tip. Any aspect of cataract surgery that increases turbulence in the anterior chamber will make an IFIS case more difficult. Conversely, any equipment, drug, or technique that stabilizes the anterior chamber makes the case easier. Following are the tools and techniques I use to manage these difficult eyes in cataract surgery.

TORSIONAL PHACOEMULSIFICATION

I use OZil Torsional Ultrasound and the INTREPID Fluidics Management System (FMS) on the INFINITI Vision System (Alcon Laboratories, Inc., Fort Worth, TX) to reduce fluidic surges and fluctuations in the anterior chamber that can exacerbate IFIS and iris prolapse in this challenging patient group. I use 100% torsional ultrasound in all my cataract surgeries, even challenging cases. The primary advantage of the OZil handpiece and INTREPID FMS in cataract surgery is the control they offer the surgeon. The Kelman tip's oscillatory movement keeps the chamber much more stable compared with the jack hammer-like movement of other handpieces with longitudinal ultrasound. I am able to maintain much more control in the anterior chamber without undesirable movements of the nuclear fragments, the lens-iris diaphragm, or the posterior capsule. Because of this level of fluidic control and the pharmacologic aid of epinephrine, I have not encountered a patient with IFIS who required mechanical stabilization of the pupil.

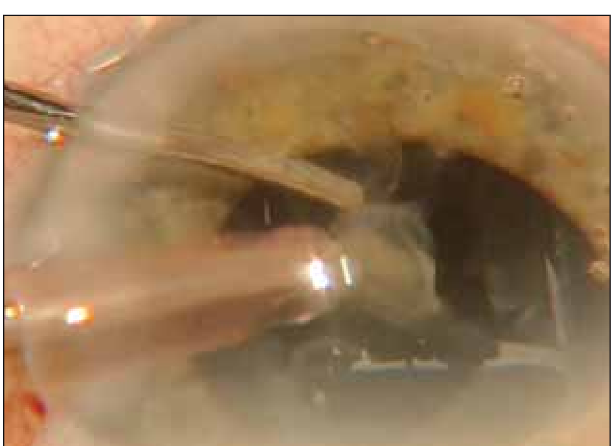

Figure 1. The nonrepulsive nature of OZil allows the phaco tip to stay in the central "safe" zone during emulsification.

"The primary advantage of the OZil handpiece and INTREPID FMS in cataract surgery is the control they offer the surgeon."

Also, the INFINITI's INTREPID FMS enables surgery through a 2.2-mm incision, which induces minimal cylinder. Some surgeons are trying to move toward even smaller incisions, but there is a trade-off of efficiency in the phaco technique and a lack of precision from wound stretching of the smaller incisions. A 2.2-mm incision permits phacoemulsification and lens insertion, even in the presence of small pupils. A one-piece acrylic lens stays rolled up on itself as the surgeon injects it through the incision and into the capsular bag.

INTRACAMERAL EPINEPHRINE

Preoperatively, if I recognize the potential for IFIS—especially if the patient is taking one of the many drugs that can induce it—I will treat the eye with intracameral epinephrine (in a 1:1000 mixture). This turns a potentially complex case into one that is routine or, at worst, a small-pupil case. Even when I do not recognize IFIS preoperatively based on the patient's medical history, if I encounter a dystonic, floppy iris intraoperatively, epinephrine still makes a huge difference. I halt my procedure and instill epinephrine intracamerally, which stiffens the iris significantly, stops the floppiness, and markedly inhibits iris prolapse.

VISCOELASTIC

I most often use DuoVisc ophthalmic viscosurgical device (OVD) (Alcon Laboratories, Inc.) in IFIS cases, because it protects and stays in the eye under high vacuum settings. Healon5 (Abbott Medical Optics Inc.; Santa Ana, CA) requires low vacuum settings to stay in the eye, and I do not want to have to reduce the vacuum to keep it in place.

TECHNIQUE

With the floppy iris stabilized, I make the capsulorhexis as large as the pupil will allow. For an IOL with a 6-mm optic, I try to have the capsulorhexis' edge just overlap the optic's edge. In the case of a 4-mm pupil, I will keep the capsulorhexis right at the edge of the pupil.

I use the 45° Kelman Mini-Flared tip (Alcon Laboratories, Inc.) with the OZil handpiece. It offers me the best combination of cutting, followability, and fluidics. I have not had to use iris hooks, Malyugen pupil expansion rings (MicroSurgical Technologies, Redmond, WA), or pupillary stretching in IFIS cases, because the OZil system works so gently.

For hydrodissection, I use a curved Osher-style cannula, which I bend to give the appearance of a shepherd's hook. This instrument allows for the easy insertion and removal of the cannula through a small incision. Additionally, it allows me to hydrodissect the subincisional region of the lens first. Usually, a single fluid wave is enough to allow for easy and complete nuclear rotation. I use a chopping technique with a Nagahara chopper (Rumex International Co.; St. Petersburg, FL), which I pass underneath the capsule to disassemble the lens. There is little turbulence in the anterior chamber, and the intracameral epinephrine stabilizes the iris, so most of my cases proceed pretty routinely.

I begin cracking and chopping the nucleus using 100% torsional ultrasound, an aspiration rate of 27 cc per minute, and vacuum of 100 mm Hg. When I bring the quadrants to the OZil tip, I increase the vacuum to 340 mm Hg and the flow rate to 45 cc per minute at 100% torsional ultrasound (Figure 1). The duration of phacoemulsification depends on the density of the lens.

LENS IMPLANTATION

I routinely use the Monarch D-cartridge (Alcon Laboratories, Inc.) to implant IOLs. I lead the elbow of the trailing haptic into the capsular bag and then allow the entire lens to open within the bag. I use a 45° I/A tip on irrigation only to inflate the anterior chamber and the capsular bag, and then I use the I/A tip to dial the lens into the bag. Keeping the anterior chamber and capsular bag inflated with the I/A tip allows for plenty of room to position everything where I need to.

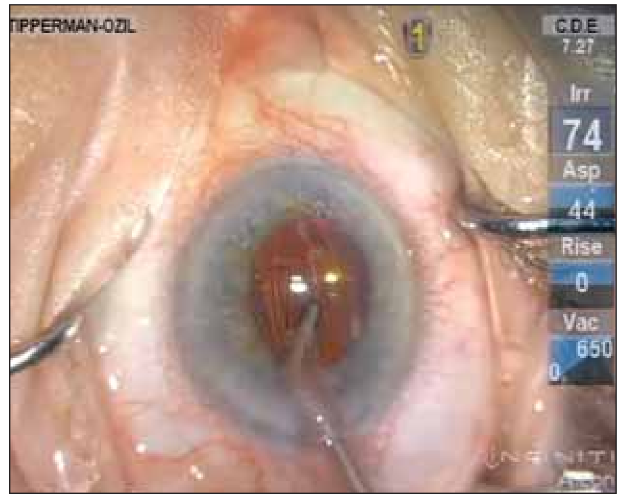

Figure 2. The author uses an I/A tip to press down on the implant to help express the OVD out of the capsular bag.

I do the same thing with toric lenses; I place the 45° I/A tip right at the haptic-optic junction and keep it on irrigation alone until I have enough space in which to dial the toric marks around to the axis alignment. I leave the I/A tip in the eye to extract remaining viscoelastic once the IOL is positioned. I will press down on the lens with the instrument to help expel any viscoelastic out of the capsular bag (Figure 2).

I test the wound closure at the end of the case, and I have a very low threshold for suturing the incision if it looks the least bit incompetent. Most of the time, however, my 2.2-mm incisions are watertight.

ONE-DAY OUTCOMES

After operating with the OZil Torsional ultrasound technology through a 2.2-mm incision, eyes with IFIS should look the same as any other postsurgical eye, even on the first postoperative day. I have not had to vary my postoperative regimen with these patients compared to standard patients. ✪

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Surgical Control in Eyes With IFIS

With INTREPID fluidics, stabilizing devices are seldom needed.

BY IQBAL "IKE" K. AHMED, MD, FRCSC

Eyes with intraoperative floppy iris syndrome (IFIS), although challenging, do not have to be a nightmare for cataract surgeons. Several technical modifications help me perform cataract surgery safely and effectively in eyes with IFIS, including proper wound construction, superior fluidics, viscodilation, and a modified soft shell technique with ophthalmic viscosurgical devices (OVDs).

THE PREOPERATIVE EXAMINATION

The first step in managing IFIS cases is taking a careful patient history. This should include asking about all current and past medications, specifically alpha blockers, which are associated with IFIS. I also like to note the color of the patient's iris and its maximum pupillary dilation under Mydriacyl 1% and Mydfrin 2.5% (both manufactured by Alcon Laboratories, Inc., Fort Worth, TX) in the office.

Of course, I also examine other anatomical and morphological features of the patient's eye and cataract for signs of any other issues, such as an extremely dense cataract, loose zonules, pseudoexfoliation syndrome, a shallow chamber, or an abnormal cornea. All of this information helps me determine what risk factors an eye may have for surgical complications; I then know the appropriate issues to discuss when I counsel the patient.

WOUND CONSTRUCTION

One must not overlook the importance of the incision in cataract surgery. I believe that a clear corneal incision is optimal, because it provides ideal access to the anterior chamber and keeps the internal incision away from the peripheral iris. I make my main incision in the temporal clear cornea to optimize this access. I make sure that both the main incision and the sideport incision, which is typically about 60º to the left of my main incision (I am a right-handed surgeon), are long enough. I like to have a 1.5-mm tunnel, and I use properly sized instrumentation to ensure that the incision closes tightly during and after the case. A tight wound equates to better surgery, no matter the technique or technology used.

The benefits of OZil Torsional ultrasound and the INTREPID fluidics on the INFINITI Vision System (Alcon Laboratories, Inc.) begin with the incision. This phaco system permits a micro-coaxial technique, and 2.2-mm incisions enhance the performance of the intraoperative fluidics. Also, 2.2-mm incisions are more square than rectangular, and square-shaped incisions appear to be better at maintaining their size during surgery and sealing more tightly afterward compared with larger incisions.[1]

The torsional ultrasound technology also protects the integrity of the wound against trauma during surgery, which can be caused by the phaco handpiece, the amount of energy used, and the delivery of the IOL. Because torsional ultrasound uses less thermal energy and cuts more efficiently than longitudinal ultrasound, my team and I find it to be gentler on incisions. In fact, we have been studying optical coherence tomographic

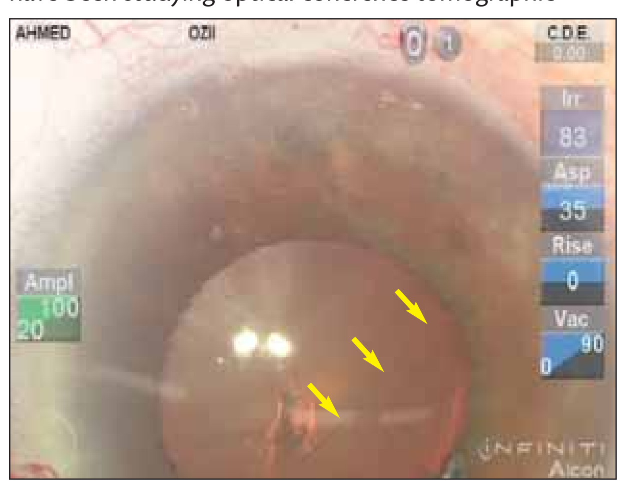

Figure 1. The author constructs the capsulorhexis (arrows) so that it passes just underneath the iris.

Figure 2. Linear fluidics permit elegant control when bringing nuclear fragments into the central zone for emulsification.

images of corneal incisions in the early postoperative period, and the torsional wounds seem to have better apposition than those that have withstood longitudinal ultrasound.[2]

THE CAPSULORHEXIS

An adequately sized capsulorhexis is key to removing the nucleus safely and efficiently. To ensure adequate size in the face of a small pupil, I construct the capsulorhexis so that it passes slightly underneath the iris (Figure 1), which lets me see the flap in relationship to the apex. If the capsulorhexis began to run outward, I would see the change in its configuration.

TORSIONAL ULTRASOUND

Two major benefits of torsional versus longitudinal ultrasound are improved followability and the reduction of intraocular turbulence, as demonstrated in laboratory testing[3] and subjectively in the eye. Good followability and low turbulence are very important when managing a floppy iris. High turbulence can cause the iris to undulate and become even floppier, which in turn increases its risk of prolapsing out of the wound and potentially being aspirated by the phaco port.

FLUIDICS

Fluidics is critical in any cataract surgery, but particularly in eyes with IFIS. The surgeon needs complete control over the machine's fluidics. I think linear control is most effective, because it enables surgeons to titrate the amount of flow and vacuum between low and high, depending on what they need for a particular stage of the procedure. For example, with OZil Torsional ultrasound, I usually use linear control of flow and vacuum in foot position 2. I use low position 2 when I am working close to the iris to attract a nuclear fragment to the phaco tip, and then I increase the flow and vacuum as I move the fragment to the center of the eye (Figure 2). Thus, the OZil Torsional ultrasound platform gives me excellent control.

In linear control, my flow rate typically ranges from zero to 40 cc per minute, and my vacuum ranges from zero to 270 mm Hg. My settings for torsional ultrasound start at 20% and go up to 60% for routine cataracts, although I will go up to 100% power for a dense nucleus. When using torsional technology, I rarely need to combine it with longitudinal ultrasound. I start the torsional rate at 20% amplitude because I find that level efficient at initiating the breakdown of lenticular material while maintaining proper flow. I have found that the Kelman 45° Mini-Flared phaco tip (Alcon Laboratories, Inc.) is the best choice for torsional ultrasound.

VISCOELASTICS

I do not think a single viscoelastic can beat the combination of a dispersive and a cohesive OVD. I prefer DuoVisc for most cases, which combines cohesive ProVisc and dispersive Viscoat (both manufactured by Alcon Laboratories, Inc.). I like to use a modified soft shell technique; I place Viscoat in a doughnut shape onto the iris, under the cornea, and then instill a bolus of ProVisc in the center of this doughnut, over the anterior chamber. The Viscoat sequesters the iris away from my working space in the center of the anterior chamber and capsular bag, and the ProVisc pressurizes the anterior chamber and creates the working space within the sequestered area. I use DuoVisc for this technique in all types of cases.

In cases in which a very small pupil is present, I use a modified soft shell technique with Viscoat as described earlier. Again, placing Viscoat on the iris helps to coat and keep the iris back, even with higher flow settings.

TORIC IOLs

Implanting a toric lens can be challenging when the pupil is shrinking, and obviously, proper alignment is critical. I mark the eye preoperatively, and then I use a cohesive viscoelastic like ProVisc to pressurize the anterior chamber, viscodilate the capsular bag, and viscodilate the pupil prior to implanting the IOL. A cohesive OVD is excellent for dilation and is easy to remove from the eye after the IOL's implantation. I fill the anterior chamber with ProVisc, but I try to use minimal viscoelastic in the capsular bag to implant the toric IOL. With a floppy iris, I want there to be as little viscoelastic as possible to remove, and I do not want to have to rotate the IOL any more than necessary after I remove the viscoelastic. As it gently unfolds in the capsular bag, this single-piece acrylic design allows me to use minimal viscoelastic in the capsular bag during the IOL's implantation (the IOL will stay in final position once placed and require minimal OVD removal).

It is important to fold the toric IOL properly, and that necessitates compression of the haptics. I place the haptics over the optic to minimize trauma to the wound as the IOL enters the eye (using a wound-assisted technique so I do not enlarge the wound). The IOL slides into the capsular bag on a steep angle of approach, and then I immediately rotate the toric lens into the position where the marks align. If I need to, I may use a Kuglen hook to push back the iris slightly to check the IOL's alignment. Then, I underrotate only slightly—about 30º in routine cases—which allows me to finally position the IOL once I have removed the viscoelastic. In eyes with IFIS, however, in which it is often difficult to achieve the final rotation because of the small pupil, I insert the toric IOL only about 10º away from its final position. The lens will rotate with very little viscoelastic, because I have positioned the compressed haptics in such a way that they follow the optic around in the capsule. Once I have the optic in position, I allow the haptics to unfold.

Next, I use a 27-gauge cannula on a syringe half-filled with BSS (Alcon Laboratories, Inc.), and I remove the viscoelastic from the capsular bag with a dry aspiration technique, which is another strategy that gives me control over the eye. As I do this, I slightly rotate the IOL to its final resting position, aligning the Toric lens' marks with the previously marked corneal steep axis. The pupil stays enlarged because I have not removed viscoelastic from the anterior chamber, and the dry aspiration technique essentially collapses the capsular bag onto the optic and the haptics of the correctly positioned Toric lens.

Finally, I use the I/A handpiece to remove the viscoelastic from the anterior chamber without worrying that the lens will move around in the capsular bag. The capsular overlap of the optic, which I consider essential to any toric IOL's implantation, effectively keeps the lens in position. If I need to, I use a Kuglen hook through the sideport incision before removing the I/A handpiece to make sure the optic's marks are aligned. I close the eye by hydrating the corneal incisions, being careful to avoid placing excessive pressure on the anterior chamber, which could cause iris prolapse. I like to ensure watertight incisions by leaving the eye at a slightly higher than physiological IOP, and then sweeping with a Weck cell and evaluating for any leaks.

The key to implanting a toric IOL in a small pupil is to ensure the OVD has been removed from the capsular bag; otherwise, the IOL may rotate postoperatively. Waiting to move the IOL into its final position until after removing the viscoelastic from the anterior chamber can be difficult in eyes with IFIS, because the pupil will have come down by that time, thus making it hard to see the alignment marks. My strategy applies to any technique, including the use of iris hooks, a Malyugin pupil expansion ring (MicroSurgical Technology, Redmond, WA), or a pupillary ring. One typically should remove the ring or the retractors after positioning the IOL and before removing the viscoelastic.

ESSENTIALS

The subtle changes in surgical technique that I have described herein have helped me through numerous surgeries on eyes with floppy irises. Some surgeons have advocated the use of intracameral epinephrine or phenylephrine, but studies on these agents have not yet been performed in a controlled manner, and I am uncertain as to their routine value. In extreme situations, the use of mechanical pupillary devices may be required. The surgeon's control of the incisions and OVDs is essential, and OZil's linear fluidic control and Torsional technology have provided the surgeon with more control. For most eyes with IFIS, these are the key points for successful phacoemulsification and IOL implantation in my hands. ✪

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Managing IFIS With OZil and DisCoVisc

Cataract surgeons can use low levels of flow and vacuum without compromising efficacy.

BY ROBERT J. CIONNI, MD

The INFINITI Vision System with OZil Torsional ultrasound and the INTREPID FMS (Alcon Laboratories, Inc., Fort Worth, TX) allows me to manage cases of intraoperative floppy iris syndrome (IFIS) efficiently and effectively, with less need to use additional pharmacological or surgical management tools.

FIRST STEPS

When beginning to operate on eyes that I suspect have IFIS, I make my incisions slightly longer than usual and position them so that I can enter the anterior chamber a little more anteriorly in order to discourage iris prolapse.

FLUIDICS

Floppy irises have a tendency to find their way into the phaco aspiration port, especially when aspiration rates and vacuum levels are high. Phaco systems that use longitudinal ultrasound require higher levels of vacuum to keep nuclear material at the phaco tip. Due to the lack of repulsion with the OZil Torsional handpiece, my settings for routine cataract surgery are the lowest of any phaco system I have used. The combination of the OZil handpiece, a 45° Kelman Mini-Flared tip (Alcon Laboratories, Inc.), and the INTREPID FMS gives me sufficient control so that when I encounter IFIS, I usually do not have to dramatically adjust my phaco settings. Furthermore, because of the efficacy of this platform, I do not need to use iris hooks or other pupil-expansion devices in about half of these cases. Several factors explain why the INFINITI Vision System with the OZil Torsional handpiece decreases the risk of complications with cataract surgery in IFIS eyes.

1. OZil Torsional technology creates smooth-flow followability. This allows the surgeon to keep the phaco tip in the central pupillary space, away from the iris' edge, where it may cause damage.

2. This technology reduces repulsion and therefore allows nuclear material to stay at the phaco tip, even at lower vacuum levels and flow rates. Thus, the surgeon can use less energy in the eye without sacrificing efficiency or having to increase manipulation of quadrants with a second instrument.

3. Lower vacuum levels and flow rates enable the surgeon to lower the bottle height and therefore decreased volatility in the anterior chamber. Greater bottle heights increase volatility in the anterior chamber and create substantial fluidic currents along the iris' surfaces that encourage pupil constriction. By lowering these stimuli, the pupil is more likely to remain well dilated throughout the procedure.

VISCOELASTIC USE

My routine ophthalmic viscoelastic agent is DuoVisc, which is the combination of dispersive Viscoat and cohesive ProVisc (Alcon Laboratories, Inc.). I typically begin with instilling Viscoat in the anterior chamber to maximally protect the corneal endothelium and maintain the anterior chamber while I make the capsulorhexis. I am careful not to overinflate the anterior chamber, which could encourage the iris to prolapse. If the pupil dilates adequately, which

Figure 1. The author emulsifies lens fragments in the central pupillary space, away from the iris.

TABLE 1. SETTINGS IN AN IFIS EYE WITH OZIL TORSIONAL ULTRASOUND

Settings for Sculpting:	
Flow rate:	30 cc/min
Vacuum level:	70 mm Hg
Torsional amplitude:	pulsed linear control (30 pps, on time 85%) with a minimum setting of 10% and a maximum of 65% to 100%, depending on lens density
Bottle height:	70 cm
Settings for Quadrant Removal:	
Flow rate:	25 cc/min
Vacuum level:	300 to 350 mm Hg (linear control with a minimum setting of 100 mm Hg)
Torsional amplitude:	pulsed linear control (30 pps, on time 85%) with a minimum setting of 10% and a maximum of 65% to 100%, depending on lens density
Bottle height:	90 to 100 cm

TABLE 2. SETTINGS FOR REMOVING CORTEX FROM AN IFIS EYE WITH OZIL TORSIONAL ULTRASOUND

Flow rate:	35 to 40 cc/min
Vacuum level:	500 mm Hg (linear control with a minimum of 70 mm Hg)
Bottle height:	90 cm

occurs in about half of eyes with IFIS, I will proceed without adding a more cohesive viscoelastic or a pupil-expansion device. If the pupil does not dilate well or if it constricts during surgery, I do not hesitate to re-expand the anterior chamber with DisCoVisc (Alcon Laboratories, Inc.) or to place a Malyugin ring (MicroSurgical Technology, Redmond, WA). The reason for switching from Viscoat to DisCoVisc at this point is that DisCoVisc is more cohesive and adds more space while still providing the protection afforded by chondroitin sulfate. In addition, it envelops the pupil similarly to Viscoat to aid against prolapse.

CATARACT REMOVAL TECHNIQUE

If the nucleus is amenable to prechopping, this technique certainly simplifies the case. Once I have prechopped a nucleus, I can seize each quadrant at its apex and bring it anteriorly, into the central pupillary space, to emulsify it as far away from the pupil margin as possible (Figure 1). If the lens is too dense to prechop, I will use a divide-and-conquer technique.

Table 1 shows my settings for sculpting with OZil Torsional ultrasound. It is important to understand that these settings are specific for OZil Torsional ultrasound with the INTREPID FMS, which has less compliance and causes significantly less volatility than older, more compliant fluidic management systems. These are also my personal settings when using the 45º Mini-Flared Kelman tip; other phaco tips may require some modifications.

CORTEX REMOVAL

The stability that the INTREPID FMS provides during nuclear emulsification is also evident during cortex aspiration. I prefer to use a silicone I/A tip for safety and versatility. Table 2 shows my settings for cortex removal with OZil Torsional ultrasound.

I simplify the removal of subincisional cortex by slightly bending the silicone tip with gloved fingers toward the aspiration port, essentially turning the instrument into a bent I/A tip. Linear control of vacuum, not aspiration, in the INTREPID foot pedal allows the surgeon to apply just enough vacuum to aspirate cortex without suddenly reaching a very high level of suction that, with a break in occlusion, would encourage the iris to move into the I/A port.

I also employ a strategy I learned from Richard Mackool, MD,[1] for safely extracting any instrument from eyes afflicted with IFIS. To decrease the risk of iris prolapse, I always discontinue irrigation and allow the eye to soften before slowly removing the I/A tip or the phaco tip.

IOL INSERTION

After I remove the cortex, I expand the capsular bag with ProVisc. Again, I avoid overinflating the bag to prevent iris prolapse. I next inject the IOL as usual and remove the OVD with settings similar to what I use to remove cortex. If I have used a Malyugin ring, I remove it before aspirating the viscoelastic. I hydrate the incisions and make certain they are watertight before ending the case.

Although IFIS has become a true epidemic in our practices, OZil with the INTREPID FMS and the curved 45º Mini-Flared tip can help us manage these tough cases. ✪

Robert J. Cionni, MD, is Medical Director of the Eye Institute of Utah. He is a paid consultant to Alcon Laboratories, Inc. Dr. Cionni may be reached (513) 984-5133.

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Fluidic Control in IFIS Eyes

Torsional ultrasound turns IFIS cases into standard ones.

BY ROBERT P. LEHMANN, MD

Cases of intraoperative floppy iris syndrome (IFIS) are becoming more common. We now know that some antihypertensive medications, such as Hytrin (Abbott Laboratories, Abbott Park, IL) may cause iris instability, and the drug tamsulosin (Flomax; Boeringer Ingelheim Pharmaceuticals, Inc., Ridgefield, CT) has a documented role in IFIS.[1-3] I also believe we should consider herbal products, such as saw palmetto, when screening patients preoperatively.

Of particular concern is that the effects from drugs like tamsulosin can persist in eyes years after patients have used them, and even if their use was brief. I have had patients deny having taken tamsulosin, but then experience IFIS during cataract surgery. In one challenging case, a patient exhibited IFIS during the procedure, and I learned afterward that he had taken only two doses of tamsulosin 2 years prior. I have seen this phenomenon in other patients and heard about it anecdotally from other surgeons as well.

The following steps help me manage IFIS cases.

THE INCISION

A well-constructed incision is especially important in eyes with a floppy iris, because incisions that are improperly made or too large will induce iris prolapse toward the wound throughout the case. Smaller incisions induce less flow out of the eye and thus are more stable. I never enter the cornea vertically; instead, I create a single-plane incision of 2.2 mm. I make my sideport incision just under 1 mm. All my incisions are sutureless, and I perform all cases under topical anesthesia.

THE CAPSULORHEXIS

If I can get a floppy pupil to dilate to 4 mm or larger, I treat IFIS cases as a normal phaco procedure. I meticulously create a capsulorhexis that is often larger than the 4-mm pupil, perhaps even up to 5 mm. In 99% or more of my cases, I am able to proceed with my usual divide-and-conquer technique and avoid the use of extraneous devices or pupil stretching that may cause more trauma to the eye.

VISCOELASTIC

I avoid overinflating the eye with ophthalmic viscosurgical device (OVD) at the beginning of a procedure, because subsequently instilling BSS (Alcon Laboratories, Inc.) into the capsular bag may make hydrodissection more difficult and cause iris prolapse. My OVD of choice is DisCoVisc (Alcon Laboratories, Inc.).

After hydrodissection, I may instill additional OVD to temporarily expand the pupil or to manipulate a nuclear fragment into a location from which it is easier to visualize and remove. With the generous amount of DisCoVisc supplied, I can instill the OVD repeatedly if desired.

PHACOEMULSIFICATION

I operate using the INFINITI Vision System with OZil Torsional ultrasound and the INTREPID Fluidic Management System (Alcon Laboratories, Inc.). I deliver hydrodissection very slowly so that I can watch for the fluid waves and make certain the nucleus is free to rotate. Once I commence torsional phacoemulsification, I stay with my standard bimanual grooving and fracture technique. I do not have a special setting for IFIS eyes, but I use several different settings for various lens densities. For example, I use the grade-4 setting for brunescent cataracts.

I emulsify the nucleus with a grooving technique, using a nucleus rotator in my nondominant left hand. I sculpt or

Figure 1. The author cracks the nucleus into halves and then rotates it 90°.

Figure 2. Using the quadrant removal setting on the OZil handpiece, the author emulsifies the nuclear fragments in the zone of safety.

groove deeply into the nucleus, crack it into two halves, and then rotate it 90° (Figure 1). Next, I either sculpt the first half or embed the phaco tip into it and crack that half into two quarters. At that point, I switch to my second setting or "quadrant removal" on the INFINITI system. I draw the nuclear fragments into the central portion of the eye or *zone of safety* (Figure 2) and then emulsify them as far away from the iris as possible.

Fluidics with the OZil Torsional handpiece are excellent. There is no chatter or repulsion like that associated with traditional longitudinal phacoemulsification. Torsional ultrasound draws nuclear material to the phaco tip, attracting material to it like a magnet. It permits a very stable chamber in which lens material is attracted to the phaco tip instead of requiring the second instrument to fish for fragments.

After I remove the first two nuclear quarters, I rotate the second half to attract its inferior pole into the central zone of safety. I emulsify the entire second half of the nucleus rather than subdividing it into two quarters. This is a more efficient nuclear management technique, totaling about 1 minute or less in most cases.

IOL IMPLANTATION

I use lens implants (usually single-piece AcrySof IOLs [Alcon Laboratories, Inc.]) that I can insert through a 2.2-mm incision utilizing the D cartridge and Monarch insertion device (Alcon Laboratories, Inc.). Immediately after insertion and before the lens fully expands, I manipulate both haptics and the optic into the capsular bag. When implanting the SN6AT series Toric IOLs (Alcon Laboratories, Inc.), I manipulate the optic so that the alignment marks are about 2 clock hours counterclockwise to the final axis position marks. Then, I use the I/A tip to aspirate the remaining viscoelastic from around the lens. When I am ready for the final positioning, I check that the patient's eye is level and head is straight, and then I use a silicone I/A tip or nucleus rotator to make sure the lens is properly aligned. I may move the iris to the side to verify proper alignment if the pupil is small and the toric alignment marks are not otherwise visible.

PEARLS

I have been performing OZil Torsional phacoemulsification since its inception, and it has been the greatest advance in my technique in recent years. Another advance has been going to 2.2-mm micro-coaxial surgery. With these two techniques, I am amazed by how stable and solid the anterior chamber remains throughout IFIS cases. The speed of nuclear removal is also much faster and safer with the OZil system than it was in my hands with traditional longitudinal phacoemulsification.

Before these two advances, I experienced greater trampolining of the iris and a less stable anterior chamber. IFIS eyes were labor intensive and more likely to cause iris trauma. If you observe one of my current cases on a patient who has taken tamsulosin, it may be indistinguishable from any other case or perhaps show only some telltale iris tenting when I withdraw the sideport instrument or I/A tip. Only rarely will a very small pupil or a very floppy iris require the use of pupil expanding devices.

Routinely, a drop of atropine is instilled preoperatively in the eyes of patients known to have taken tamsulosin. I may occasionally add some Shugarcaine[4] for the infusion when the pupillary diameter diminishes significantly during surgery. I do not use this in my routine cataract patients.

This past year, I have switched to the OPMI Lumera microscope (Carl Zeiss Meditec, Inc., Dublin, CA). The enhanced red reflex has made small-pupil cases much easier to manage than previously ✪

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