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Feature

Spotlight On Cataract Complications

Surgery videos shown at the 2008 Cataract Spotlight Symposium in Atlanta gave audience members a chance to ponder how they would manage similar situations. See what they said and review expert commentary.

This past November, the seventh annual Spotlight on Cataract Surgery session at the Academy's Joint Meeting was entitled Cataract Complications—Video Case Studies: Why? What Now? How? Cochaired by Mark Packer, MD, and me, this four-hour event was organized to feature eight video cases that demonstrated a variety of cataract surgical complications.

Dr. Packer and I selected and presented the video cases, which we would pause at the point of a complication. The attendees were then asked to make clinical decisions using electronic keypads. This was followed by several rapid-fire didactic presentations on topics of relevance to the case. Next, two panel discussants (who had never viewed the case) were asked to make their own management recommendation before the video of the outcome was shown. Following additional audience polling about preferences and practices, the two panelists had the final say.

In all, more than 40 presenters and panelists spoke about managing unhappy multifocal IOL patients, intraoperative floppy iris syndrome (IFIS), vitreous loss and dropped nuclei, the Argentinean flag sign, capsulorhexis tears and zonular dialysis. Richard Lindstrom, MD, concluded the symposium by delivering the Academy's fourth annual Charles Kelman Lecture, entitled Cataract Surgery in the Glaucoma Patient.

This article reports the results of the 32 audience response questions, along with commentary that the symposium speakers and panelists contributed after the Joint Meeting. Because of the anonymous nature of this polling method, the audience opinions are always interesting, made more so by discussion in real time during the event by the panelists.

The Academy's Annual Meeting now features a daylong, continuous series of cataract events that constitute Cataract Monday. The Spotlight on Cataract Surgery program was followed by the ASCRS-cosponsored symposium on the Surgical Correction of Presbyopia, the Spotlight on IFIS symposium, and the Around the World in 80 Minutes International symposium on Devices for Complicated Cataract Cases—What Are American Surgeons Missing?

—DAVID F. CHANG, MD
Cataract Spotlight Program Cochairman
Chairman, Academy Annual Meeting Program Committee

Unhappy Multifocal IOL Patient

Q1: How would you manage –2.0 D surprise in a multi-focal IOL patient?

PRK	26%
LASIK	28%
Mini-RK	1%
Piggyback IOL	7%
IOL exchange	23%
Refer to refractive surgeon	15%

David Hardten This question initiates thoughts on a not-uncommon question in patients having multifocal or typical aspheric IOL implantation with cataract and lens implant surgery. It is important to have thought through management options before surgery, and I think it is helpful, in a general sense, to discuss with patients ahead of time that if they don't achieve their goal with the refractive portion of the cataract surgery, there are options for fine-tuning refractive results postoperatively.

The spread of answers to this question shows that no one answer always solves the problem and that there are many viable options. I also tend to lean in low myopic or astigmatic errors toward laser vision correction—LASIK because of the quicker recovery in patients with normal epithelium and corneas; PRK for patients with anterior basement membrane dystrophy or other corneal abnormalities, or if I have done prior relaxing incisions. I think that many surgeons who don't do many laser vision cases are also more comfortable with PRK than LASIK.

Piggyback IOLs are a viable option for spherical refractive errors, but they are not as good if astigmatism is involved, and it is important to verify that there is normal peripheral zonular support as well as enough depth to the space between the iris and current IOL. IOL exchange is also a viable option, albeit one that is a little more involved than other options.

Certainly if the surgeon does not do laser vision correction, then referral to someone who is familiar with these techniques is a good option. However, I think the trend over the next several years will be toward familiarity with all options for those surgeons who do a significant number of cataract procedures in patients with high expectations.

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Q2: How would you manage +2.0 D surprise in a multifocal IOL patient?

PRK	12%
LASIK	21%
CK	4%
Piggyback IOL	12%
IOL exchange	43%
Refer to refractive surgeon	9%

Warren Hill It was interesting that the audience response poll showed that the majority of surgeons favored an IOL exchange and only a small percentage would select the less-challenging option of a piggyback IOL. Early in the postoperative course, and when there is no question as to the power of the IOL implanted, exchanging the correct IOL for the incorrect IOL is generally the better idea. LASIK and PRK—33 percent of the audience poll—are still reasonable alternatives, especially if there is residual refractive astigmatism.

It is encouraging that more surgeons are now willing to do an IOL exchange than may have been inclined to do this previously. With the majority of surgeons now using optical coherence biometry and immersion biometry for the measurement of axial length, and an ever-increasing number moving toward the use of newer-generation IOL power calculation formulas, such as Haigis and Holladay 2, an IOL power surprise should become a less-frequent issue.

Jack Holladay For the hyperopic surprise, IOL exchange received 43 percent, followed by LASIK at 21 percent and PRK at 12 percent. It's interesting to compare these results with those seen with the previous question on myopic surprise. The differences are not surprising, given that most surgeons feel that the larger hyperopic laser treatments are not quite as good as their myopic counterparts, and that not re-entering the eye is a primary consideration with PRK or LASIK.

The piggyback IOL, which is an excellent alternative, received a smaller amount of support. For either myopic or hyperopic surprise, the refractive formula for calculating the secondary piggyback IOL power is exact and eliminates another surprise if the primary IOL is mislabeled.

Many IOL models are now available, ranging from –20.0 D to +10.0 D; they are made for the sulcus and provide an excellent method of treating a refractive surprise. In addition, refractive and wavefront measurements through multifocal IOLs are more difficult than

through monofocal IOLs and may lead to erroneous measurements.

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Q3: Despite reassurance, and trying topical brimonidine, a multifocal IOL patient has nighttime glare in his or her emmetropic first eye, along with significant posterior capsular striae. What do you recommend next?

Nd:YAG the posterior capsule	68%
Remove multifocal IO in the first eye	18%
Implant multifocal IOL in the second eye	6%
Implant monofocal IOL in the second eye	6%
Implant accommodative IOL in the second eye	3%

Kevin Waltz The audience clearly preferred to address the problem by treating the eye with the complaint, not by treating the fellow eye. While it would be important to aggressively treat any dry eye in a case like this, it was not one of the listed options. In the case of significant striae, it is reasonable to open the posterior capsule. The patient needs to understand that the capsulotomy makes a subsequent IOL exchange more difficult.

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Q4: Following a YAG capsulotomy and a complaint of persistent bothersome multifocal halos, I would:

Strongly discourage IOL exchange because of risks	62%
Exchange IOL (fold it)	3%
Exchange IOL (cut it)	17%
Exchange IOL (large incision)	5%
Refer elsewhere for IOL exchange	13%

Steve Lane While the majority of respondents answered that they would discourage IOL exchange in the face of an open capsule, there are times when patients are so unhappy that surgery must be considered despite the possible complications.

It is critical that the potential complications be discussed prior to surgery. These would include cystoid macular edema (CME), retinal detachment and corneal decompensation. The surgeon embarking on such a procedure must be prepared to perform a pars plana vitrectomy and be comfortable suturing IOLs to the iris and/or transsclerally as the bag may need to be sacrificed during removal.

Most often, however, the IOL can be safely viscodissected free from the bag and prolapsed up into the anterior chamber leaving the residual capsule intact. If vitreous presents, the pars plana vitrectomy should be performed before removing the IOL to release any traction that may be present. The IOL can then be removed using any of the techniques described according to what the surgeon is most comfortable with. IOL replacement should then be performed placing the IOL in the most stable position possible, realizing that fixation to the iris or sulcus may be required.

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Q5: Describe your current use of multifocal IOLs (for presbyopic correction):

Use exclusively multifocal IOLs	29%

Use both multifocal and accommodating, but prefer multifocal IOLs	8%
Currently use both multifocal and accommodating, but prefer accommodating IOLs	7%
Tried multifocal IOLs, but stopped or rarely use now	12%
Have never implanted multifocal IOLs	44%

Eric Donnenfeld Refractive IOLs are rapidly becoming mainstream treatment for presbyopia following cataract surgery. Refractive IOLs offer a unique opportunity to improve quality of life for patients. The majority of respondents have employed multifocal or accommodating IOLs, with multifocal IOLs being preferred in this survey over accommodating lenses. However, further refinement in technology is necessary, as 44 percent of respondents have not tried either of these lenses, and 12 percent of respondents have tried multifocal IOLs and have stopped using them.

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Intraoperative Floppy Iris Syndrome

Q6: Do you stop tamsulosin (Flomax) prior to cataract surgery?

Never	71%
Occasionally (< 20%)	5%
Sometimes (<20–50%)	3%
Usually (> 50%)	6%
Routinely	15%

Howard Fine We never stop tamsulosin prior to cataract surgery, and that is consistent with what over 70 percent of the attendees at the symposium indicated. There are variable responses to tamsulosin and variable degrees of IFIS. Although some who have stopped it previously still have floppy irides at surgery, others who have stopped it have relatively mild floppy irides and even some who are still on it have relatively mild floppy irides.

Our procedure involves the use of preoperative atropine, three times a day, for a week prior to surgery. If the pupil has dilated, we will then use Shugarcaine, which in our experience doesn't dilate the pupil as much as hold it in the dilated position. We would probably use Healon 5 to expand the pupil further and then we would proceed by carefully utilizing biaxial microincision phaco. This has an inordinately advantageous characteristic of tamponading the iris because the incoming fluid from the irrigating chopper is basically above the iris. Unless you irrigate under the iris, the iris does not billow and become floppy. If, however, the pupil began to come down, we would consider making a central incision and introducing either a Malyugin or a Morcher ring, which would then allow us to continue with our biaxial phaco, since the 2.2-mm incision would be self-sealing. We have basically had excellent success in this way, and our complication rate is no higher than for those who do not use $alpha_1$ agonists.

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Q7: For a pupil dilating to 7 mm in a patient who stopped tamsulosin 18 months ago, I would initially:

Use topical atropine only	5%
Use intracameral epinephrine or phenylephrine	14%
Use Healon 5/dispersive OVD with lower fluidic settings	7%

Insert mechanical devices (hooks, ring)	14%
Other strategy	1%
Use multiple strategies	47%
Do nothing different	12%

Sam Masket The key issue in managing the cataract surgery patient with past or current exposure to tamsulosin is adequacy and maintenance of pupil dilation. Most often, a pupil that dilates well will preclude the development of IFIS, as the floppy iris typically occurs in the susceptible eye when the infusing fluid is directed to the undersurface of the iris, causing the flaccid iris to balloon forward and prolapse through the cataract incisions. A widely dilated pupil generally precludes the irrigating stream of BSS from pushing the iris forward. However, even in the presence of a wide pupil at the outset of surgery, a floppy iris may develop, particularly if the pupil tends to become miotic. For that reason, surgeons need to be prepared for IFIS in all "exposed" cases.

For the case in question, the pupil dilated adequately and the patient had discontinued tamsulosin 18 months earlier. While these facts may suggest a smooth operative course, we know that patients may exhibit IFIS despite having discontinued medication and the pupil may become miotic intraoperatively despite wide dilation at the outset.

Approximately half of the respondents to this question opted for use of multiple anti-IFIS strategies. This is logical, as one may use a stepwise approach to the potential problem and add strategies sequentially. One concept that I prefer is to initiate IFIS prophylaxis pharmacologically (atropine 1 percent topically two days prior to surgery and intracameral epinephrine or phenylephrine), employ retentive viscoagents intraoperatively, alter fluidic inflow and outflow during surgery as needed and then, if necessary, employ mechanical devices, such as iris hooks or the Malyugin ring, to fixate the pupil. These strategies are synergistic, not competitive, and add to the likelihood of a successful surgical course and outcome.

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Q8: In the previous patient (Q7), surgery began without using any special IFIS measures. However, the pupil constricted and started to prolapse as soon as the phaco tip was inserted with irrigation. At this point, I would:

Proceed with phaco (nothing different)	6%
Instill Healon 5 and lower the fluidic settings	14%
Instill DisCoVisc or a dispersive OVD, using the same or lower fluidic settings	8%
Instill intracameral epinephrine	23%
Insert iris retractors	30%
Insert Malyugin or other pupil ring	17%
Other	1%

Steve Arshinoff It is interesting that in the preceding question, audience members overwhelmingly stated that they would use multiple strategies to manage IFIS. We see here that once confronted in surgery with a problematic IFIS case—one that had not been previously suspected and for which the anterior chamber was not previously prepared—the audience proposed no unified approach. Instead, all strategies, except doing nothing, got significant portions of votes.

The symposium speakers would like to compliment the audience on these responses and suggest that a major takeaway message of this symposium should be to adopt a stepladder approach to IFIS, beginning with pharmacology (cholinergic blockade and adrenergic stimulation), progressing to judicious and careful use of ophthalmic viscoelastic devices (OVDs) and, finally, adding iris hooks or the Malyugin ring if needed. The audience already seems to have gotten the message, but the choice of answers did not allow them

to state that, so the next best choice was to pick "your preferred isolated next strategy," resulting in choices across the board.

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Q9: How difficult is phaco with tamsulosin (compared with non-IFIS)?

No different	3%
More difficult, but surgical risks no higher	11%
More difficult, with slightly increased risk	61%
More difficult, with much greater risk	26%

Bruce Wallace IFIS remains a significant challenge for cataract surgeons. As we can glean from the responses, there really is no magic bullet to handle these cases, so multiple strategies are needed to avoid iris contact during nuclear removal.

A preoperative discussion with patients and their family members is worth considering due to the unpredictable nature of these procedures. I have found multiple reinjections of disposable DuoVisc to help protect the iris helpful, especially when a patient appears to have an adequate pupil preoperatively but miosis develops during the procedure.

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Q10: Would you take tamsulosin if you had BPH and mild cataracts?

Yes, if recommended	23%
Yes, but have cataract surgery first	16%
No, take a nonselective alpha-blocker	29%
No, avoid all alpha-blockers if possible	26%
Too late, I'm already taking it	6%

Nick Mamalis It is interesting that almost one-fourth of respondents stated that they would take tamsulosin if recommended. This likely reflects the fact that this particular group of surgeons either does not realize the risks involved with cataract surgery and IFIS or has faith that this surgery can be performed without significant increased risk. Of interest is the fact that greater than half of the respondents stated that they would either take a nonselective alpha-blocker or avoid all alpha-blockers if possible. This likely reflects the fact that the surgeons are concerned that cataract surgery in patients with tamsulosin and subsequent IFIS can be more difficult or have an increased risk of complication. Only 16 percent of respondents stated that they would have cataract surgery done prior to starting this medication. These results highlight the broad range of opinion that cataract surgeons have regarding tamsulosin in patients with mild cataracts.

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Descending Nucleus

Q11: During hydrodissection there is sudden pupil expansion and egress of OVD out of the side ports. At this point I would:

Loosen the nucleus by rotating it	11%
Initiate phaco in the bag without rotation	14%
Prolapse the nucleus into the anterior chamber for phaco	42%

Convert to manual large incision ECCE	25%
Do PAL technique	7%

Walter Stark A sudden pupil expansion with deepening of the anterior chamber during phaco can indicate a break in the posterior capsule or possibly extreme weakness of the zonules. A break in the posterior capsule should be suspected if the patient has had prior vitrectomy with possible damage to the posterior capsule.

I agree with the respondents that the best technique is to prolapse the nucleus into the anterior chamber for phaco. This is facilitated if the patient has a wide capsulotomy and if good hydrodissection was performed. However, more aggressive hydrodissection could further extend the posterior capsular tear and hasten dislocation of the nucleus.

The nucleus can be brought into the anterior chamber by the posterior assisted levitation (PAL) technique or by lowering the infusion bottle and using the phaco tip to burrow into the nucleus and then lift the nucleus into the anterior chamber.

These techniques can be combined. Once the nucleus is in the pupillary plane and free of its attachments to the capsule, infusion pressure can be increased slightly to avoid collapse of the anterior chamber. After removal of the nucleus—and cortex and any prolapsed vitreous—a three-piece acrylic IOL, Alcon's 6.5 mm MA50BM, can be inserted into the posterior chamber, anterior to any remaining capsule, with pupillary capture of the optic. A single-piece acrylic IOL should not be placed in the sulcus as it may cause UGH (uveitis-glaucoma-hyphema) syndrome. The haptics can be sutured to the peripheral iris superiorly and, if necessary, inferiorly with a 10-0 Prolene suture on a CTC needle. Once securely sutured, the IOL optic is placed in the posterior chamber. Remember to decrease the power of the IOL by 0.5 D, as the lens is further forward in the eye.

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Q12: The lens was rotated and began to sink posteriorly. At this point I would:

Attempt to aspirate the nucleus with the phaco tip	0%
Levitate the nucleus with a PAL technique	14%
Abandon the nucleus—without implanting an IOL	17%
Abandon the nucleus—perform a vitrectomy and implant an IOL	68%

Julia Haller The audience response here reflects an appropriately thoughtful, careful approach by the participants. Overall, 17 percent felt more comfortable delaying implantation of an IOL, while 68 percent had the experience required to go ahead and place an IOL in the sulcus. It is worth considering a "safety suture" in such cases, particularly if there are significant areas of questionable or missing capsular support. Interestingly, 14 percent of the audience has acquired enough experience with the PAL technique to employ that approach. Presumably this reflects their observation that the nucleus is still positioned anteriorly enough for this technique to be used safely. They may want to have the patient checked by a retina colleague postoperatively for any evidence of peripheral retinal issues. This case illustrates one of many situations where collegial collaboration between anterior and posterior segment surgeons can benefit patients enormously.

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Q13: With a dropped nucleus and insufficient anterior or posterior capsular support, which IOL would you insert?

No IOL—defer until after the nucleus was removed by a vitreoretinal surgeon	29%
ACIOL	49%
Scleral sutured PCIOL	12%
Iris sutured PCIOL	9%

Roger Steinert Both the existing literature and the audience are in agreement. A well-sized and well-positioned modern anterior chamber IOL gives good results. The literature data suggest that skilled implantation of a sutured PCIOL results in less IOP elevation, but it has the potential to come with increased rates of IOL tilt and retinal detachment. Regarding the "no IOL" alternative, the retina specialist in another talk expressed the opinion that implantation of an IOL with a dropped nucleus is acceptable. Only an extremely dense and large nucleus might require delivery of the nuclear fragment into the anterior chamber during the secondary vitreoretinal procedure.

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Q14: Are you comfortable suture fixating a PCIOL?

Not comfortable doing this	59%
Comfortable with and prefer iris suturing	12%
Comfortable with and prefer scleral suturing	21%
Comfortable with and use both iris and scleral suturing	9%

Garry Condon More than 40 percent of the respondents were comfortable with suture fixation of a PCIOL in the absence of capsule support. While there still appeared to be a preference for scleral suturing, I believe the more recently reported techniques and results with iris suturing may be shifting more surgeons in that direction. Iris suture fixation of a foldable acrylic PCIOL to the iris via a 3.5-mm incision can potentially benefit those patients who are aphakic, need IOL exchange or develop loss of capsule support during primary cataract surgery. Potential advantages over scleral fixation include less astigmatism, no suture exposure risks and less likelihood of suture breakage.

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Descending Nuclear Fragments

Q15: During phaco, there is a sudden and momentary widening of the pupil, expansion of the chamber and partial posterior movement of multiple chopped nuclear fragments. What now?

Close the eye and refer the patient	16%
Try to continue phaco	27%
Convert to large incision ECCE	16%
PAL technique followed by phaco of the fragments	34%
PAL technique followed by manual large incision extraction of the fragments	8%

Rosa Braga-Mele When the capsule breaks and there are still some nuclear fragments, it is imperative that one stops phaco but does not withdraw the phaco hand. At this point the use of viscoelastic to maintain chamber stability is essential. The fact that 27 percent of the audience would continue to phaco is a bit disconcerting as this would likely push the remaining pieces into the vitreous and draw up vitreous, likely causing more problems.

The next step would depend on where the loose fragments are situated. If they are still visible in the anterior vitreous, then either floating them up anteriorly or using a PAL technique is an excellent idea. Once the fragments are supported anteriorly with either viscoelastic or a Sheets glide posteriorly, then one can proceed with phaco at lower flow parameters.

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Q16: Have you used the PAL technique for descending nucleus?

I have tried it, and it is my preference for this situation	24%

I have tried it—bad idea/not comfortable	10%
I have never tried it but would consider trying	48%
I have never and wouldn't ever do it	18%

Richard Packard Although PAL is not a new technique by any means, it was perhaps surprising that only a third of respondents had even tried it. Gratifyingly, however, the majority of those in this subset preferred using it in this difficult situation. Of those who had not tried it, almost three-quarters would consider trying what I regard as a useful bailout technique when nuclear pieces are held in the immediate area of the ruptured posterior capsule.

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Q17: Have you performed an anterior vitrectomy through a pars plana sclerotomy?

I have tried it, and it is my preference for vitreous prolapse	30%
I have tried it—bad idea/not comfortable	7%
I have never tried it but would consider trying	38%
I have never and wouldn't ever do it	25%

Jay Duker I find it interesting that nearly one-third of cataract surgeons polled currently prefer the pars plana entry site for performing anterior vitrectomy. Nevertheless, almost the same percentage of respondents does not plan on using pars plana vitrectomy in the near future. The pars plana approach to anterior vitrectomy has definitely gained a following among anterior segment surgeons, but those preferring the technique remain in the minority.

Skip Nichamin I am pleasantly surprised to see that almost one-third of respondents are currently employing a pars plana approach when faced with the need to perform an anterior vitrectomy, and that nearly 40 percent more feel that it is a good idea and will consider doing so in the future. This speaks to the fact that there is logic and benefit behind this technique, and that the corpus of practicing ophthalmologists are indeed open to new ideas and continue to be willing to learn techniques that at one time would have been considered verboten. At the heart of this discussion resides the unmitigated desire to do what is in our patient's best interest, especially in complex settings.

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Q18: Following posterior capsular rupture and anterior vitrectomy, but no retained nucleus, would you refer the patient for a retina consultation within the first few weeks?

Yes, I would routinely refer this patient	48%
I would only refer if the patient had other risk factors (e.g., high myopia or a history of retinal detachment)	3%
I would only refer if there was retained cortex/ epinucleus	21%
I would observe and only refer if it later became necessary	28%

Harry Flynn The audience response was in agreement with immediate retinal consultation, and I strongly concur with this recommendation. Eyes with displaced or retained lens fragments have a high rate of retinal detachment. Early consultation may allow detection of retinal breaks before retinal detachment occurs. Appropriate early treatment and follow-up may allow optimal visual outcomes.

A small minority of the audience, 3 percent, would refer to a retina specialist only if the patient were myopic or had a history of retinal detachment.

Approximately one-quarter of respondents would refer only if retained cortex or epinucleus were present. Eyes with substantial vitreous loss and persistent vitreo-iridal adhesions may be at risk for delayed traction and CME, even if no lens material is retained. A retinal colleague could help in the continued follow-up of such patients.

The final option was observation with no referral. If the cataract surgeon is comfortable with examining the peripheral retina and managing CME, then this option can be considered.

Elsewhere at the Joint Meeting, a series of 459 patients with retained lens fragments after cataract surgery was presented.[1] All patients were managed by vitrectomy, and the retinal detachment rate was 11.8 percent. The primary causes of decreased vision in this series were retinal detachment, corneal edema and CME.

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1 Olmos, L. C. et al. Poster #27, Retinal detachment rates and visual acuity outcomes of patients undergoing pars plana vitrectomy for retained lens fragments. Presented at the Joint Meeting of the American Academy of Ophthalmology and the European Society of Ophthalmology, Saturday, Nov. 8, and Sunday, Nov. 9, 2008. View this poster at www.aao.scientificposters.com.

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Mature White Lens

Q19: For a white lens, I stain the capsule with dye:

And use an air bubble	67%
And use Healon 5	10%
And use another OVD	11%
Via direct injection	13%

Uday Devgan Using a dye such as trypan blue to stain the capsule can facilitate capsulorhexis creation in eyes with white cataracts. While these dyes are generally considered safe to use in the eye, care should be taken to protect the corneal endothelial cells and minimize the intracameral dose of dye used.

The majority of cataract surgeons use an air bubble in the anterior chamber so that only a few drops of dye are needed for capsule staining and there is minimal, if any, dye contact with the corneal endothelium. Injecting a small amount of dye under viscoelastics, particularly super-cohesives like Healon 5, is also an appropriate choice and may be more efficient.

Directly injecting a large quantity of capsular dye into the anterior chamber should be avoided in order to minimize the risks and the potential for corneal endothelial cell damage.

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Q20: Argentinean flag tear[1] with a white lens—at this point, I would:

Perform a can opener capsulotomy and continue phaco in bag	40%
Prolapse the nucleus into the AC and continue phaco	23%
Convert to ECCE (temporal incision)	9%
Convert to ECCE (superior incision)	28%

Bob Osher Once the Argentinean flag has occurred, the anterior capsular extension will likely arrest in the zonules. Yet it doesn't take much force to extend the tear around the equator through the posterior capsule. Then the surgeon is in real trouble because both the anterior and the posterior are compromised.

Any of the above choices will work, although I would prefer to inject Healon 5, snip the

capsule with microscissors, then perform an anterior capsulotomy trying to leave the peripheral anterior capsule intact. Following slow-motion phaco with torsional ultrasound, the cortex would be removed carefully. I would implant a single-piece IOL, orienting the lens perpendicular to the tear while the haptics were still folded over the optic, preventing contact with the equator of the bag. Once the OVD was removed, the IOL would open within the bag.

If this strategy failed, I would fall back on either sulcus or iris fixation or an anterior chamber IOL.

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1 A horizontal tear across the typan blue-stained anterior capsule.

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Q21: Argentinean flag tear with a black lens (Fig. 5)—at this point, I would:

Perform a can opener capsulotomy and continue phaco in bag	12%
Prolapse the nucleus into the AC and continue phaco	16%
Convert to ECCE (temporal incision)	18%
Convert to ECCE (superior incision)	55%

Kevin Miller The answers to this question presuppose that the average ophthalmologist would have planned a phaco from the outset, which we know from the next question is not the case. It's interesting to note from the previous question (Q20) that, while most respondents would continue phaco if a white cortical cataract produced an Argentinean flag sign, they would convert to an ECCE if confronted by the same sign in the setting of a black cataract. Concern over radializing a tear posteriorly and dropping the nucleus into the vitreous cavity is clearly greater for black cataracts.

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Q22: Your rock hard cataract technique:

Routinely phaco	29%
Routinely use manual ECCE	25%
Regularly do both—it depends on patient	7%
Routinely start phaco, but convert early to ECCE if uncomfortable	38%
Refer these patients	2%

Lisa Arbisser I was truly surprised to find that such a significant percentage of ophthalmologists would plan an extracapsular approach or convert to one for a dense lens. Today's powerful ultrasound technology allows any nucleus to be effectively and safely emulsified while viscoelastics provide superb endothelial protection. Chop techniques, particularly combined with circumferential disassembly, permit controlled removal of most of the dense material at or below the iris plane while retaining epinucleus to protect the posterior capsule and provide structure to support weak zonules.[1]

Hopefully, the future will see more surgeons gaining the skills and confidence to tackle—or the will to refer—these challenging cases. The brunescent cataract patient need not be denied the benefits of small-incision surgery.

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1 Arbisser, L. B. *Video Journal of Cataract and Refractive Surgery* 2006;1.

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Radical CCC Tear

Q23: In this case where the anterior capsule is tearing radially, what would you do next?

Continue with Little capsule tear-out maneuver	25%
Initiate a new tear from the opposite direction	59%
Make one or two radial tears in the opposite quadrants	3%
Convert to a can opener capsulotomy	14%

Brian Little When any surgeon is faced with a rhexis tear-out, the most important response is to choose the safest option. At the moment, the majority of respondents favor restarting the rhexis from the opposite direction, although this still leaves us with a tear-out in the anterior capsule. I think the fact that one in four surgeons now prefers the rhexis rescue maneuver, described just two years ago,1 is a testimonial to the fact that it really does work in clinical practice. The hurdle we all face is that none of us wants to be trying out a new technique for the first time in the heat of the moment. My suggestion is to try it on a pig's eye in the wet lab using capsular staining. The tearing response of this highly elastic lens capsule accurately emulates that of the human capsule. The added elasticity means that the backward then central vector forces need to be exaggerated and therefore become more clearly understood when applied in this setting.

Alternately, try using this technique to centrally—and slightly—redirect a normal and well-controlled rhexis when there is no risk involved.

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1 Little, B. C. et al. *J Cataract Refrac Surg* 2006;32:1420–1422.

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Q24: After re-tearing the anterior capsule from the opposite direction, the intersection creates a corner in the capsulorhexis edge. How would you proceed?

Convert to manual ECCE	4%
Continue with normal phaco technique	39%
Phaco in bag, but avoid hydrodissection	11%
Phaco in bag, but avoid nuclear rotation	12%
Phaco after prolapsing entire nucleus into AC through the capsulorhexis	34%

Bill Fishkind Not surprisingly, 84 percent would try to complete the capsulorhexis [Q23]. It is good judgment to try to utilize the Little technique and redirect the tear. Prior to doing this, it is essential to alleviate posterior pressure with the addition of generous amounts of cohesive OVD in the anterior chamber, thus neutralizing the vector forces tearing outward.

If redirection is possible, the intact rhexis permits straightforward phaco. If redirection is unattainable, tearing from the opposite side is the prudent alternative. The phaco can then be completed in the anterior chamber, with the nucleus surrounded by OVD, thus avoiding pressure on the torn equatorial capsule. It is essential to keep in mind that a tear in the equatorial bag might expand due to excessive positive (downward) pressure as well as excessive negative (upward) pressure from the anterior chamber, with ensuing movement of the capsular bag.

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Q25: Can a single-piece acrylic IOL be placed in the ciliary sulcus?

Yes, if anterior capsule support is adequate	40%

Yes, if it is suture fixated	2%
Only if no other PCIOL is available	11%
Never	47%

Kerry Solomon Two single-piece acrylic IOLs are approved for use in the United States: Alcon's AcrySof and AMO's Tecnis single-piece lens. These IOLs are designed for—and are really ideal for—capsular fixation. In some instances, they can be placed into the capsule even when the integrity of the anterior or posterior capsule has been compromised.

However, single-piece IOLs really are not best suited for sulcus fixation. The overall diameter of these lenses, while ideal for capsular fixation, is slightly undersized for the ciliary sulcus. Even when optic capture is possible, single-piece lenses are not well suited for sulcus fixation. First, these lenses have minimal to no posterior angulation. As such, the optic may be more likely to prolapse anteriorly, increasing the risk of pupillary capture. Second, the anterior displaced optic and the bulkier single-piece haptics may promote more iris chafing, increasing the risk for pigment dispersion syndrome and increased IOP. In my opinion, single-piece lenses are best suited for capsular fixation when the optic and haptics will be placed in the capsular bag.

When sulcus fixation is necessary, with or without optic capture, my preference is for a three-piece foldable lens to be used, optimally with an overall diameter of 13.0 to 13.25 mm. For this reason, three-piece lenses need to be available for those instances where a single-piece IOL is not warranted.

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Q26: What IOL would you place in this eye with a torn capsulorhexis and posterior capsule?

ACIOL	3%
PCIOL in sulcus without suturing	95%
Scleral sutured PCIOL	1%
Iris sutured PCIOL	1%

Howard Gimbel The audience clearly feels most comfortable and confident with placing an IOL in the sulcus if both the CCC and the posterior capsule are compromised. That would also be my choice if there is a good amount of capsule on which to put the IOL and if visualization is good enough to confirm proper placement. The iris or scleral suture approach can always be used if there is decentration or lens movement after healing is complete. The problems with simple sulcus placement usually occur years postoperatively as Soemmering's ring tissue thickens and displaces the lens eccentrically or pushes the loops and optic against the iris.

Patients with sulcus lenses should be observed regularly through their lives. If problems arise after the fibrous metaplasia has fused the capsule into a membrane, the technique of membrane optic capture may be considered to stabilize and center troublesome sulcus lenses. If membrane optic capture cannot be used, it may be possible to use capsular membrane suture fixation to attach the IOL to the fibrotic membrane for fixation and centration.

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Q27: In a case with vitreous loss but successful IOL placement in the ciliary sulcus, I would:

Immediately inform the patient of the complication	60%
Wait until later to discuss the complication	18%
Not discuss unless further complications arise later	22%

Ken Rosenthal A basic ethical construct in medicine, also enumerated in the Academy's Code of Ethics, is that "It is the responsibility of an ophthalmologist to act in the best interest of the patient."

When a problem occurs during surgery that may affect the outcome, it is essential to be forthright in disclosing it to the patient and his or her family. The communication should convey enough information, using terms that the patient is likely to understand, so that the patient has a clear understanding of the problem as well as its impact on the prognosis. This conversation should take place promptly following surgery.

In this instance, I would avoid using the term "complication," which is often interpreted by the patient as indicating that a poor outcome is likely to occur and may generate unwarranted anxiety and concern. Historically, vitreous loss has had consistently dire consequences, such as intractable CME or retinal detachment. But with the use of contemporary technology and technique, vitreous loss is as likely to have a good outcome as a bad one. Compromised capsular support with placement of an IOL in the sulcus also is likely to have a good outcome.

I would tell the patient that the surgery was successful, but that additional surgery was performed to remove the vitreous gel due to a tear in the capsule, and that the lens implant had to be placed differently than usual. I would appropriately reassure the patient that he would most likely have a good outcome. I would explain that there is an increased risk that the IOL may decenter, that CME may occur and that additional surgery may be needed, but that everything has been done to minimize the likelihood of this happening.

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Q28: Following surgical complications, I believe an apology and full disclosure:

Increases the risk of being sued	13%
Decreases the risk of being sued	66%
Isn't a major factor in likelihood of lawsuit	21%

David Dillman Of course, there are multiple additional considerations to this question, such as: Did the complication require additional surgical intervention? Was the final outcome good or not so good? Was there any element of medical negligence associated with the complication? There is also a huge difference between an authentic, heartfelt apology and a "going-through-the-motions" apology.

That said, we now know—based upon scientific data—that an authentic apology along with full disclosure is by far the best source of reconciliation available to the doctor, the facility, etc., following a complication. I was pleased to see that 66 percent of the audience already understands this. My mission is to get that number to 100 percent.

For additional information about the whys and hows of medical apology and disclosure, I strongly urge ophthalmologists to visit www.sorryworks.net.

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Traumatic Cataract

Q29: In this eye with a history of a traumatic penetrating injury and an iridodialysis, I would initially:

Proceed with phaco without other devices	36%
Proceed with phaco after CTR placement	27%
Proceed with phaco after placing capsule or iris retractors	18%
Proceed with manual ECCE	4%
Refer the patient	14%

Alan Crandall In an eye with a traumatic iridodialysis, you can usually assume at least 2

more clock hours of zonular compromise beyond what you can see at slit lamp. Checking the integrity of the remaining zonules as you begin the capsulorhexis will provide you with a good idea of how much additional support is needed. I prefer to delay inserting a capsular tension ring (CTR) as long as possible, and if there is a need early on of added capsular support, I would use Mackool hooks or a capsular tension segment (CTS). If there are fewer than 4 to 5 clock hours of zonular dialysis, a standard CTR may work fine. However, if the zonular dialysis is larger, then I use a modified Cionni ring and suture it to the sclera.

Dick Mackool Although 45 percent of the respondents would attempt to stabilize the capsule/lens complex by insertion of a CTR and/or the use of capsule retractors, the most common response would be to attempt to perform the procedure with phaco alone. This may be possible if the lens appears to be stable during the performance of the capsulorhexis, but it would be highly inadvisable if this were not the case.

Using retractors to fixate the capsule is the most reliable method, in my experience, to achieve stability of the capsule/ lens complex. In the future, it would not be surprising if capsule retractors and a CTR are used from the onset of the procedure. Viscodissection to separate cortex from capsule followed by insertion of a corrugated CTR may make it possible to do this without adding to the difficulty of cortex removal.

It must be noted, however, that should the integrity of the lens capsule be violated during the procedure, previous insertion of a CTR can cause significant problems.

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Q30: If there was a small amount of vitreous presenting at the nasal pupil edge, how would you proceed?

Isolate the vitreous with OVD, delay vitrectomy and proceed with phaco	29%
Do vitrectomy via limbal incision followed by phaco	16%
Do vitrectomy via pars plana incision followed by phaco	11%
Perform manual large incision ECCE	4%
Refer to anterior segment surgeon	13%
Refer to vitreoretinal surgeon for lensectomy-vitrectomy	28%

Bonnie Henderson In the previous question (Q29), only 14 percent of the audience would refer to another surgeon—but with vitreous present, the comfort zone narrows and 41 percent would refer. The reluctance to proceed with the surgery may be prudent since the published literature shows that vitreous loss is associated with up to a 10-fold increase in risk of complications such as retinal detachment and CME.

Of those surgeons willing to tackle this case, most are comfortable using OVD to hold back the vitreous while starting the case. This may reflect the advances in types of OVD that are now available. Another interesting result is that nearly the same percentage of people would perform the vitrectomy via an anterior limbal approach as would via a pars plana approach. This may reflect an increasing acceptance of pars plana vitrectomies performed by anterior segment surgeons. This result is also supported in question 17 where an overwhelming 68 percent of the audience preferred or would consider trying a pars plana vitrectomy.

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Q31: For triamcinolone staining of vitreous, I:

Use Alcon Triesence	9%
Reconstitute preserved Kenalog	32%
Have never tried using triamcin- olone, but am interested	55%
Am unlikely to ever use it	5%

Michael Snyder I am encouraged that 95 percent of the respondents either do use or will consider using triamcinolone as a tool in their surgical arsenal for visualization of the vitreous gel in the anterior segment. It can be instrumental in managing complex cases in the safest and most facile possible way.

However, of those who currently use this technique, only one-fourth use the branded, preservative-free product while the majority uses a preserved off-label version. This is a more surprising response and may be influenced by three possible factors. First, there may be institutional inertia. Those who have been using the off-label version have been doing so for some time and may be satisfied with their results. Second, the branded product is relatively new to the market, and there may not be full awareness of its availability. Third, there is a multifold cost differential between the branded and off-label versions and in this era of increasing medical costs, efficient frugality has both impact and merit. Even so, in the absence of rigorous corneal endothelial safety testing of the off-label products, which do contain preservative, I prefer to use the preservative-free product.

With regard to the 5 percent who do not use and do not intend to use this technique, they may be highly experienced in the management of anterior segment vitreous from indirect cues and justifiably may not perceive a need for this tool in their hands.

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Q32: What PCIOL fixation would you use with a 3- to 4-clock-hour zonular dialysis?

No CTR and IOL in bag	7%
CTR and IOL in bag	55%
Cionni ring or CTS, and IOL in bag	8%
IOL in sulcus, without suturing	22%
IOL in sulcus, with suture fixation	3%
ACIOL	5%

Bob Cionni When faced with loss of zonular support, one must consider the nature and extent of zonular compromise to determine the best means of providing an IOL. Mild degrees of zonular loss without significant decentration can likely be managed with a standard CTR and in-the-bag IOL placement. Indeed, a standard CTR can be used in those patients who have as much as 180 degrees of zonular dialysis as long as there is not significant lens decentration.

More extensive zonular loss will likely require a sutured modified CTR, once again allowing for in-the-bag IOL placement. In addition, progressive disease conditions such as pseudoexfoliation with significant zonular weakness will likely require a sutured modified CTR and/or IOL.

Markedly loose lenses may not provide enough support for a modified CTR; in these cases, one may opt for an ACIOL in older patients or, in younger patients, a PCIOL sutured to the posterior surface of the iris or to the scleral wall through the ciliary sulcus. Nonsutured PCIOLs should not be placed in the ciliary sulcus in the setting of zonular loss.

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At Home

The entire **Spotlight on Cataract Surgery 2008** symposium, including the video cases, is available on DVD-ROM. To order, please visit www.aao.org/meetings/annual_meeting, then click on "Meeting Archives." On the next page, scroll down to DVD-ROMs and click "Purchase online." This will take you to the Conference Cart Web site where you can place your order. Price for members: Web access only, $139; DVD-ROM plus Web access, $159. Price for nonmembers: Web access only, $189; DVD-ROM plus Web access, $209.

Plan Ahead

Mark your calendars: **Spotlight on Cataract Surgery 2009** will be held during Cataract Monday on Oct. 26 in San Francisco.

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FINANCIAL DISCLOSURES

FINANCIAL INTERESTS ARE DESIGNATED BY C, L, O, P or S.

C = CONSULTANT/ADVISORS: Consultant fee, paid advisory boards or fees for attending a meeting (since January 2008).

L = LECTURE FEES: Lecture fees (honoraria), travel fees or reimbursements when speaking at the invitation of a commercial sponsor (since January 2008).

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P = PATENTS/ROYALTIES: Patents and/or royalties that might be viewed as creating a potential conflict of interest.

S = GRANT SUPPORT: Grant support since January 2008 (all sources) and all sources used for this project if this is an update from a specific talk or manuscript with no time limitation.

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