

Unexpected IFIS

Five steps to avoiding this unpleasant surprise.

BY STEVEN DEWEY, MD

Chang and Campbell defined *intraoperative floppy iris syndrome* (IFIS) as shrinking of the pupil in combination with billowing and prolapse of the iris during cataract surgery.¹ I personally define IFIS as the case poised to derail my surgical schedule despite my best efforts to identify the potential problem preoperatively. Missing IFIS during the preoperative screening significantly increases the risk for permanent damage to the iris and capsular rupture.

The problem is the variability in physiology—not just from patient to patient but from eye to eye in the same individual. Aggravating factors are the inconsistent reliability of patients' histories, the potential of virtually any medication with alpha-blocking effects to cause IFIS, and the possibility that the condition will affect women as well as men. For these reasons, IFIS has become the most frequent condition with the potential of causing intraoperative complications.

I feel that it is imperative for surgeons to consider options that effectively treat all patients as if they have IFIS rather than simply try to select those with known risk factors. Surgeons who manage small pupils with stretching techniques or sphincterotomies (Figure 1) will have to modify their mindset to reduce intraoperative manipulation of the iris. For ophthalmologists with special orders, such as preoperative atropine, my approach may seem too broad a solution. The steps outlined in this article, however, have served me well for making these cases far more routine.

STEP No. 1. ALTER THE DILATING REGIMEN

I found atropine effective for dilating the pupil, but I also found it difficult to predict which of my patients would need this drug. After its administration sent two of my patients into acute urinary retention, I stopped using atropine.

Intracameral unpreserved epinephrine is the most frequently administered agent for enhancing pupillary dilation and tone in IFIS. Myers and Shugar recognized that the preoperative topical instillation of tropicamide significantly improved the dilating effect of a lidocaine-epinephrine mixture (epi-Shugarcaine).² Part of the brilliance of this regimen is the avoidance of the longer-acting cyclopentolate as well as topical phenylephrine, but the technique has some limitations. First, the tropicamide must be absorbed and have time to take effect. Second, the concentration of epinephrine is a bit weaker than it needs to be for IFIS patients.



Figure 1. A damaged iris sphincter.

Thus, with a little help from a compounding pharmacy, I am currently using a mixture of 0.2% tropicamide mixed with 2% lidocaine, which is then diluted with unpreserved 1:1,000 epinephrine in the OR for my final intracameral dilation regimen. The end result contains 0.1% tropicamide and 1% lidocaine and reduces the concentration of epinephrine by one-half rather than three-quarters.³

With the patient on the operating table, my first step is to create the sideport incision. About 0.3 mL of the dilating mixture is then placed in the anterior chamber. I create the primary incision, and as I completely fill the anterior chamber with a dispersive viscoelastic, the dilating mixture is effectively flushed out of the eye. Occasionally, the chamber will have lost enough pressure with the intracameral delivery of the dilating mixture that I will instill the viscoelastic prior to making the primary incision. The only variable here, however, is the timing of the viscoelastic's placement. If the pupil is already large and the likelihood of IFIS is exceptionally low, the viscoelastic can go in almost immediately. If the pupil is small, I wait a few seconds to allow the mixture to take effect.

This regimen is amazing for its efficiency: patients spend virtually no time in the outpatient area waiting for the pupil to dilate. The absolute amount of dilation may not be as great as with topical drops, but the tone of the iris seems better. Although this may seem a trivial matter, I no longer appear to need epinephrine in the irrigating solution.

STEP No. 2. STABILIZE THE ANTERIOR CHAMBER

Although this is the goal in every cataract procedure, I found that some simple changes in technique and instrumentation can make big differences. First, I use smaller phaco needles, a general trend being promoted by all of the manufacturers of phaco machines. Certainly, current phaco units offer significantly improved fluidics compared with older machines. Simply changing from a 19-gauge to a 20-gauge needle, however, restricts flow and thus stabilizes the chamber. Of course, smaller needles will stabilize the chamber even more.

Second, I now place the cataract incision as far from the iris base as possible. For surgeons who prefer a scleral tunnel, the best compromise is to move to the surgical limbus. The tunnel should still be square. Clear corneal incisions may not be as effective if the tunnel is exceedingly short.

Third, when creating the incision, I make the entry of the blade as straight in and straight out as possible. In this regard, I have greater difficulty with the sideport incision than the primary incision, and this problem is usually associated with the patient's immobility (or lack of it) and access (more difficult with smaller lid fissures or larger brows).

STEP No. 3. USE A SAFER PHACO NEEDLE

In eyes with a small pupil, I strive to move nuclear fragments to the tip rather than fish for them. I had to change my technique quite a bit, but the alteration has been very successful at avoiding incidental damage to the iris.

The premise is that an in situ chop will create appropriately sized and freely mobile fragments. Phacoemulsification then takes place deep in the capsule, with the phaco needle in the center as I use the second instrument to bring nuclear fragments to the tip. The aspiration rate must remain relatively high to allow for strong attraction, and the vacuum must also stay relatively high to optimize apposition of the needle to the fragment. (In my experience, lowering the flow and vacuum in small-pupil cases often means that retained nuclear material appears postoperatively.) In terms of followability in these cases, I prefer a venturi pump with the Whitestar Signature System (Abbott Medical Optics Inc., Santa Ana, CA).

My rationale for using the Dewey Radius Tip (MicroSurgical Technology, Redmond, WA) is twofold. First, the rate of capsular complications in patients taking Flomax (Boehringer Ingelheim Pharmaceuticals, Inc.) has been demonstrated to be much higher than in "routine" patients. Although the Dewey Radius Tip is not perfect, upon contact with power applied, it breaks the posterior capsule significantly less often.⁴ Second, even after careful planning, I will occasionally aspirate an iris into the lumen of the phaco needle. The polished edge of the Dewey

Radius Tip typically will not cut the iris sphincter or damage the stroma, even with the application of power.

STEP No. 4. UNDERSTAND VISCOELASTICS' BEHAVIOR

Dispersive or viscoadaptive viscoelastics physically dilate the pupil well prior to the capsulorhexis. In my experience, a dispersive agent will add a millimeter to the pupil's diameter. Regardless of the viscoelastic used, however, once phacoemulsification has begun, the iris will no longer be tented over the anterior capsule, and this extra dilation will be lost. Dispersives will remain in high-flow situations, but these agents do not sequester the iris as well as a viscoadaptive viscoelastic. Both classes will mechanically improve the iris' stability.

Compared with dispersive and viscoadaptive agents, cohesive viscoelastics do not form as effective a barrier for the iris. Nor do they remain in the chamber once phacoemulsification has begun. Although cohesive agents will effectively distend the posterior capsule for the IOL's implantation, they are not going to reduce the complication rate in IFIS eyes, either through improved dilation or mechanical stabilization.

STEP No. 5. ENSURE STABLE MECHANICAL RETRACTION OF THE IRIS

Manipulating the iris in a case of IFIS seems to make the condition worse. As noted by Chang and Campbell in their original description, pupillary stretching or sphincterotomies exacerbate the situation.¹ Intraoperative instability of the anterior chamber causes mechanical manipulation of the iris in the form of "trampolining." Fishing nuclear fragments from the anterior chamber can also change fluid dynamics and places the iris at further risk of unintended aspiration.

A "normal" small pupil is not necessarily aggravated by manipulation, but the line between a normal, small pupil and an IFIS pupil has become hazy. It is therefore imperative to treat all small pupils like IFIS pupils. Methods for retracting the pupil must be stable. Iris retractors create a square opening and are reusable, but their placement is time-consuming and unnecessary in the vast majority of IFIS cases. I prefer the Malyugin Ring (MicroSurgical Technology), which is simple to insert and remove. The ring also creates a rounder pupil with eight points of stability. It is, however, a single-use device.

The question is when to place either device. I typically perform surgery without difficulty on eyes that have 3.5-mm pupils and good tone. Interestingly, while reviewing video examples of my IFIS cases, I have seen significant miosis develop without incident. Probably more surprising was my lack of awareness of the progressive miosis until I reviewed the videos.

When pupillary dilation is inadequate or the iris demonstrates significant laxity during the capsulorhexis, iris retractors or the Malyugin Ring will prevent disaster. In all other cases of small pupils, I prefer to wait and see. Iris prolapse through the main incision is one of the events that will trigger my use of the Malyugin Ring. Unfortunately, this complication can occur even with controlled hydrodissection and may require me to move the primary incision.

A lesser reason for placement of a Malyugin Ring or iris retractors is the aspiration of the iris into the lumen of the phaco needle. I have found that a stable 3.5-mm pupil may not need retraction, but a billowing 5-mm pupil may suddenly prolapse through the incision or end up in the lumen of the needle. If aspiration occurs with the very last bit of nucleus, perhaps retraction at that point is overkill. Still, aspiration of the iris is probably the best warning that the IFIS will worsen during the rest of the case and stable mechanical dilation of the iris is indicated. Of course, with a sharp needle, the damage is done, whereas with a rounded needle, the iris will likely remain intact.

CONCLUSION

The case that used to be the biggest headache on my surgical schedule is now nearly routine. I have not encoun-

tered any clinical complications from modifying my regimen 18 months ago to account for possible IFIS. Recognizing patients with potential IFIS remains important, however, because some will quickly pass through the stages of mild to moderate to severe. The regimen I recommend will help catch the evasive IFIS patient and prepare the surgeon for that unexpected, worsening scenario. ■

A video of this technique is available at <http://eyetube.net/?v=hinim>.



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