

# Managing Iris Prolapse at the End of Cataract Surgery

Careful attention to fluid dynamics can remedy this frustrating complication.

BY DANIEL H. CHANG, MD

Iris prolapse is a challenging condition that cataract surgeons prefer to avoid. At best, this is a minor complication that lengthens a case and causes the surgeon frustration and the patient discomfort. At worst, the iris can be traumatized, leading to increased postoperative inflammation, transillumination defects, iris distortion, and pupillary abnormalities, all of which can increase night vision symptoms, decrease quality of vision, and reduce the patient's level of satisfaction. Minimizing iris prolapse is especially important in patients who receive a premium lens such as a Tecnis Multifocal IOL (Abbott Medical Optics Inc.), for which proper centration and positioning with respect to the visual axis and the pupil's center are essential.

Much has been written about techniques and devices for dealing with iris prolapse related to intraoperative floppy iris syndrome (IFIS). Earlier this year, *Cataract & Refractive Surgery Today* published an excellent article sharing pearls for iris prolapse during hydrodissection and phacoemulsification.<sup>1</sup> Important to remember, however, is that the iris commonly prolapses in eyes with and without IFIS near the end of cataract surgery. After phacoemulsification, IOL implantation, and the removal of viscoelastic material—when rings or hooks no longer remain inside the eye—the surgeon is limited as to how he or she can manage a prolapsing iris. Stromal hydration, the very technique that seals the corneal wound, can create a relatively high-flow state and potentiate iris prolapse.

I experienced a slew of cases of iris prolapse during a recent nationwide shortage of preservative-free epinephrine. I typically use 0.3 mL of a 1:100,000 dilution of preservative-free epinephrine in my irrigating solution bottle during cataract surgery. This is an off-label but common practice that helps to maintain mydriasis and the iris' rigidity throughout the case. Without epinephrine, I observed an increased incidence of iris prolapse during stromal hydration at the end

of cases even in eyes with moderate pupillary dilation and no prior IFIS. With the use of epinephrine, I only encounter iris prolapse during stromal hydration in cases of moderate to severe IFIS.

## FOUR SIMPLE MANEUVERS

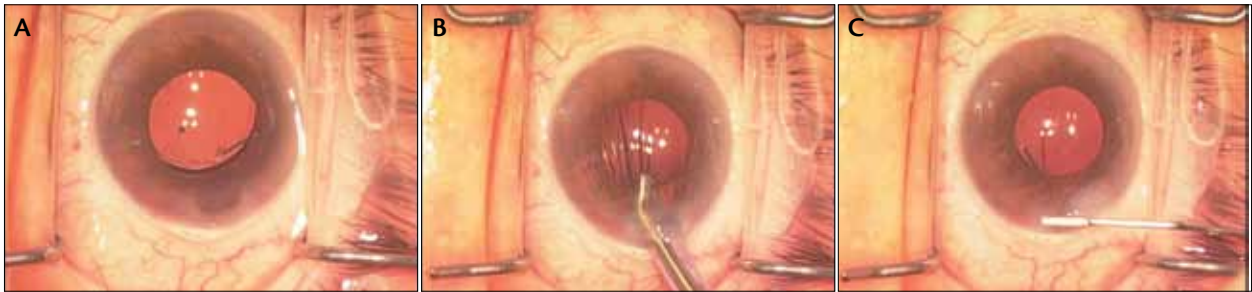
Four simple maneuvers can help surgeons manage a prolapsing iris at the end of cataract surgery. None of these techniques requires anything more than a hydrating syringe and a cannula. One point to bear in mind is that the iris goes where the fluid flows. Surgeons are often taught that, once an iris prolapses, it somehow develops a “memory” and will keep coming forward into the wound. This is partially true; a flaccid iris may be less resistant to unfavorable flow conditions, but even a floppy iris will not prolapse if fluid is not flowing out of the eye. The reason an iris prolapses repeatedly is because fluid repeatedly flows in a manner to facilitate the prolapse. The solution is to remedy the pressure gradient that causes the fluid flow that brings the iris forward.

### Step No. 1. Stop Irrigation

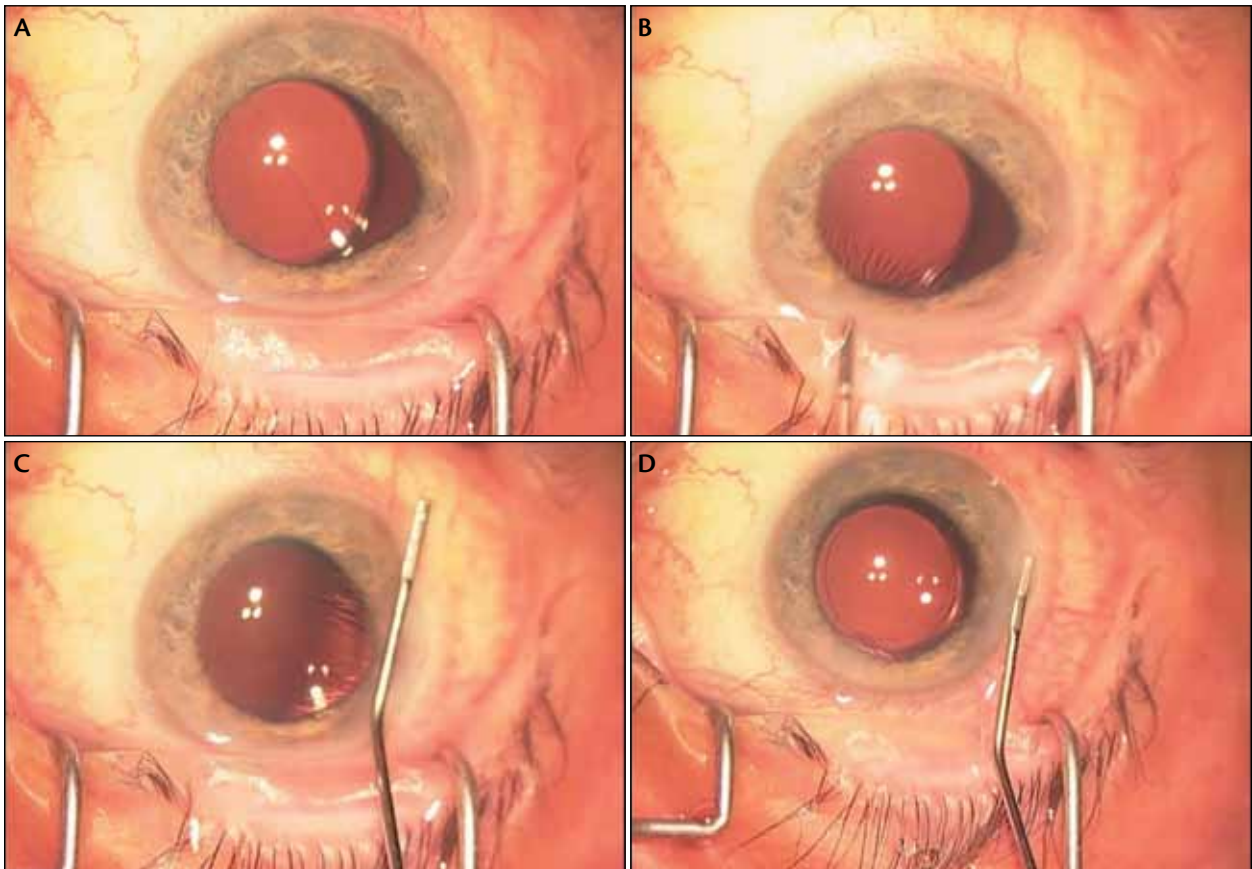
Simply removing the I/A tip from the eye after the removal of viscoelastic can precipitate iris prolapse, particularly in eyes that have a history of iris prolapse or IFIS (Figure 1). Because the IOP is elevated during I/A, fluid (and possibly the iris) will briefly but rapidly come out of the eye when the tip is withdrawn. In cases of iris prolapse or IFIS, I stop the irrigation and let the eye soften slightly before I exit the eye (Figure 1). With a lower IOP, minimal fluid flows out of the eye, and the iris is less likely to prolapse.

### Step No. 2. Tap the Paracentesis Port

If the iris prolapses into the wound despite my use of the first technique (Figure 2), I resist the urge to push



**Figure 1.** The iris prolapsed into the surgical wound (A). To prevent recurrent prolapse, the surgeon leaves the I/A handpiece in the eye until the IOP is reduced. Note the corneal striae in a soft eye (B). Stromal hydration is carefully performed with the hydrating cannula's tip pointed as tangential to the wound as possible (C). Minimizing fluid delivery into the eye reduces the flow of fluid from the eye, thus preventing iris prolapse.



**Figure 2.** The iris is in the surgical wound (A). Fluid is removed from the paracentesis port to reduce the pressure gradient and flow across the surgical wound (B). Massaging the anterior lip of a corneal wound will pinch the iris back into the eye (C). Hydrating the wound slowly and tangentially keeps the iris out of the wound while it seals (D).

it back in place with a cannula. Reentering the wound, even with viscoelastic, works against the goal of removing the iris and closing the wound and will likely be ineffective. Instead, I lower the pressure gradient across the wound by tapping the paracentesis port (Figure 2). The lower IOP stops the fluid flow through the wound, allowing the iris to settle back into the eye.

### **Step No. 3. Press the Anterior Lip of the Wound**

If the first two techniques are not fully effective, I press on the anterior lip of the wound with the shaft of my cannula and stroke centrally (Figure 2). The anterior lip pinches against the posterior lip to ease the iris back into the eye without my actually touching the iris with instrumentation. After the iris is out of the wound, sim-

ply pressing the lips of the wound together can help to facilitate wound closure as well.

#### Step No. 4. Hydrate the Stroma

After the iris is back in the eye, I use stromal hydration to seal the wound and to re-equilibrate the IOP. Normally, this is done as a single step, but if stromal hydration results in iris prolapse, I go back to tapping the paracentesis and massaging the wound. The reason stromal hydration can result in iris prolapse is because the introduction of fluid back into the eye raises the IOP and re-creates the pressure gradient (and flow) across the wound. The goal is therefore to hydrate the stroma without filling the eye. I achieve this by placing my irrigation cannula as tangential to the incision as possible and slowly injecting balanced salt solution (Figures 1 and 2). This technique is a success when stromal edema is evident without significant deepening of the anterior chamber. After the wound appears to be sealed, I fill the anterior chamber with balanced salt solution. I start out slowly until it deepens and the iris moves posteriorly. I fill the anterior chamber more rapidly when the risk of repeat prolapse is reduced.



#### BEING MINDFUL OF HYPOTONY

These simple and easy maneuvers are based on my understanding of fluidics at the end of cataract surgery. I use some or all of these steps to finish up a case quickly and cleanly and even sometimes after battling the iris for the entire cataract procedure. It is important to keep in mind that, when the IOP is lowered to subphysiologic levels (note corneal striae in Figures 1B, 2B, and 2C), there is a risk of suprachoroidal hemorrhage. For that reason, I remain cognizant of modifiable risk factors such as systemic arterial hypertension, coughing, and duration of hypotony. Fortunately, these steps can be performed quickly, typically taking only a few seconds.

#### CONCLUSION

The rash of iris prolapse I experienced has allowed me to approach these cases with confidence instead of frustration. Now, I see iris prolapse at the end of a cataract case as a minor speed bump on the road to a great surgical outcome. ■

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1. Arregui P, Banta JT, Nixon DR, et al. Pearls for iris prolapse. *Cataract & Refractive Surgery Today*. March 2012;12(3):30-33.