Intraoperative Floppy Iris Syndrome

A large spectrum of pharmacological and mechanical treatments available today facilitate the effective management of IFIS.

BY UDAY DEVGAN, MD

Intraoperative floppy iris syndrome (IFIS) was described first by David F. Chang, MD, in 2005 as a condition during cataract surgery associated with the use of tamsulosin (Flomax; Boehringer Ingelheim Pharmaceuticals, Inc., Ridgefield, CT), an alpha blocker used to treat an enlarged prostate.[1] Other alpha blockers, including homeopathic medications, have subsequently been associated with IFIS. Even a short course of this medication years prior to cataract surgery can cause permanent changes to the iris' tone, and discontinuing the alpha blocker has not been found to reduce the incidence of IFIS.

The first sign of IFIS is often a poorly dilating pupil prior to surgery. Upon making the initial incision into the eye, surgeons will observe excessive floppiness of the iris, lax tone, and a tendency for the iris to prolapse out of the eye (Figure 1). The various options for managing IFIS range from pharmacologic treatment to the intraoperative use of mechanical devices.

Figure 1. The iris prolapses out of the corneal incision due to IFIS.

PHARMACOLOGIC TREATMENT

Preoperative mydriatic agents such as atropine (1% solution) can help to restore tone to the iris and achieve a sufficient level of dilation prior to the surgery. Robert Osher, MD, described the topical use of atropine 1% twice a day for a few days before surgery.[2] Samuel Masket, MD, has combined preoperative atropine with the intraoperative use of diluted unpreserved epinephrine to further enhance the iris' tone and the level of pupillary dilation.[3] Surgeons can use various strengths of epinephrine, ranging from 1:4,000 to 1:20,000, but they should ensure that it is bisulfite-free and not preserved (American Regent, Inc., Shirley, NY) and that the diluting agent is balanced salt solution.

The late Joel Shugar, MD, created a very effective mixture that he called *epi-Shugarcaine*, a pH-neutral agent that provides intracameral anesthesia as well as increased iris tone and pupillary dilation.[4] The mixture is created from the following agents:

- 9 mL fortified balanced salt solution (BSS Plus; Alcon Laboratories, Inc., Fort Worth, TX)
- 4 mL bisulfite-free 1:1,000 epinephrine
- 3 mL unpreserved lidocaine 4% (Hospira, Inc., Lake Forest, IL)[5]

The final mixture has a neutral pH of 7, 1:4,000 epinephrine, and 0.75% lidocaine. The surgeon instills a small amount, 0.25 to 0.50 mL, into the anterior chamber at the beginning of a case. Because the mixture is not preserved, it requires refrigeration and should be discarded at the end of the day—or sooner if the solution takes on a reddish/brown color. I have found epi-Shugarcaine effective for most cases of IFIS, particularly when it is administered at the beginning of the procedure and again between the steps of cataract surgery.

MECHANICAL DEVICES

To expand the pupil and prevent the iris from prolapsing, surgeons can hold the iris with mechanical devices. The most commonly used tools are iris hooks, which surgeons place through additional incisions to retract the iris, typical-

Figure 2. The surgeon uses a Malyugin Ring to dilate the pupil and retract the iris in a case of IFIS.

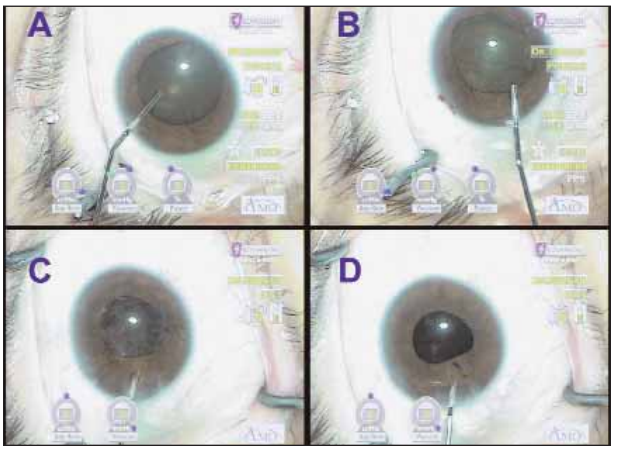

Figure 3. Healon5 can form a mechanical barrier in cases of IFIS. In viscomydriasis, the OVD expands the pupil and retracts the iris (A). Injection of a plug of Healon5 depresses the subincisional iris and prevents it from prolapsing during phacoemulsification (B). Another plug of OVD is injected prior to cortical removal with the I/A probe (C). A final plug of Healon5 keeps the iris away from the incision prior to the IOL's insertion (D).

ly at four points. Other options include the Graether Pupil Expander (Eagle Vision, Inc., Memphis, TN) and the Perfect Pupil Expander (Milvella Ltd., Sydney, Australia). A surprisingly simple yet very effective device is the Malyugin Ring (MicroSurgical Technology, Redmond, WA), which retracts the iris and expands the pupil (Figure 2). Simple mechanical stretching of the pupil is usually not effective and should be avoided.

OPHTHALMIC VISCOSURGICAL DEVICES

An effective way to keep the iris securely in position and to prevent excessive floppiness and prolapse is to use a super cohesive ophthalmic viscosurgical device (OVD) such as Healon5 or Healon GV (both from Abbott Medical Optics Inc., Santa Ana, CA) as a barrier and mechanical plug. Other cohesive OVDs are acceptable alternatives, but I find that the super cohesives tend to perform better in eyes with IFIS (Figure 3).

INCISION: CONSTRUCTION AND LEAKAGE

Surgeons should place the clear corneal incision slightly more anterior than usual. If it is too posterior and close to the anterior chamber angle and iris root, there may be an increased tendency for the iris to prolapse. A long tunnel for the incision can provide added stability.

Surgeons should make the corneal incision just large enough to place the phaco probe in the eye, without an excessive amount of leakage. The egress of fluid destabilizes the anterior chamber and makes the iris more likely to prolapse via the sites of leakage.

It is advisable to check the incisions with fluorescein dye at the end of the case to ensure that they are watertight. If the seal is in doubt, I suggest placing a 10–0 nylon or Vicryl (Ethicon Inc., Somerville, NJ) suture to secure the wound.

THE STEPWISE APPROACH

I have found it most convenient to manage IFIS with a stepwise approach. As noted earlier, I routinely use an epinephrine mixture such as epi-Shugarcaine for these eyes. If the tissue remains excessively floppy, I will add a plug or ring of Healon5 on top of the iris. If further measures are required, I insert a mechanical device such as the Malyugin Ring.

Although IFIS certainly can make cataract surgery more challenging, the large spectrum of products available today facilitates its effective management. Patients should be educated that IFIS increases their risk of complications from cataract surgery but that our stepwise approach can help to make their procedure safer. ■

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