Preventing Reverse Pupillary Block

I tried to get too sophisticated, and this was the result.

BY JASON JONES, MD

Certain cases haunt me. Once I have gained some distance from surgical events, I find reviewing intraoperative video recordings educational. I would like to describe a case in which I attempted to avoid a problem and ended up with a complication. Even so, the lessons I learned have had a positive effect on my career for the past 6 years.

THE CASE

The patient was in her late 40s, highly myopic, and status post retinal detachment repair with a scleral buckle. Puncture of the capsule to initiate the capsulorhexis proved difficult because of zonular laxity, but completion of the capsulotomy was uneventful. The soft nucleus rose out of the capsule during hydrodissection, permitting me to use a tilt technique to remove the cataract. Upon the I/A tip's insertion, the anterior chamber deepened, indicating a tendency for reverse pupillary block. I relieved the block by lifting the pupillary margin with the I/A tip. Cortical removal was uneventful, and I placed a three-piece acrylic IOL without incident.

Recognizing the tendency for reverse pupillary block, I irrigated the I/A handpiece outside the eye (to fill the sleeve with saline and thus avoid bubbles) and placed the I/A tip under the IOL in the capsular bag. I wanted to reduce the chance of reverse pupillary block, so I lifted the pupillary margin with a spatula through the paracentesis. I initiated irrigation and then witnessed a rapid hyper-deepening of the anterior chamber, which broke the temporal 180° of zonules (Figure). I removed the I/A handpiece and inspected the damage.

THE RECOVERY

Because the bag containing the IOL was intact but clearly unstable, I elected to insert a capsular tension ring (CTR). After manipulating the CTR into the bag, the lens appeared to be better centered. During I/A to remove the ophthalmic vimsurgical device (OVD), however, it was obvious this anatomy would not be stable. An inspection of the

Figure. Dr. Jones lifts the nasal pupillary margin, only to see half the zonules rip apart.
incisions with a sponge and sweeping of the main incision indicated that no vitreous was in the anterior chamber. I then asked the patient about her detachment repair. She could not be certain but thought she recalled that her retinal surgeon had removed the vitreous gel of her eye.

I fashioned a capsular tension segment by cutting a Cionni Ring for Sclera Fixation (Morcher GmbH, distributed in the United States by FCI Ophthalmics, Inc.) with drape scissors. (This case occurred before the Ahmed Capsular Tension Segment was available in the United States [same manufacturer and distributor].) With capsular hooks stabilizing the bag, I placed the partial Cionni ring into the capsule, secured the eyelet to the sclera with passage of a double-armed 10–0 Prolene suture (Ethicon, Inc.), and tied the knot on the scleral surface. I closed conjunctiva over the knot. The capsule and lens were very stable and well centered. The patient experienced a successful outcome and good recovery of vision.

**WHAT I LEARNED**

My attempt to avoid hyper-deepening of the anterior chamber caused by reverse pupillary block was well intentioned but improperly executed. Moreover, once the zonular complication occurred, several missteps made the completion of surgery more cumbersome and difficult. With critical review, I gained insight into my surgery and incorporated the following changes into my routine.

No. 1. Be Thorough When Taking the History and Making an Examination

When a patient has a history of retinal detachment repair, I specifically ask him or her about vitreous removal, and if in doubt, I contact the retinal surgeon. I also scrutinize the eye for a posterior vitreous detachment or vitreous syneresis that indicates the presence of the gel. Vitreous cushions the variations in pressure from anterior chamber irrigation. Without vitreous, the anterior segment may become overly deep, resulting in discomfort for the patient and, possibly, zonular damage.

No. 2. Heed Evidence of Zonular Laxity

If the capsule wrinkles upon attempted puncture with a Utrata forceps, then using a sharp instrument such as a hypodermic needle will be gentler on the zonules. As soon as I detect evidence of zonular instability, I alert my staff. They assemble potentially useful devices or equipment (eg, additional OVD, CTRs, backup IOLs) and make them ready for use.

No. 3. Use Appropriate Techniques to Prevent Reverse Pupillary Block

Without irrigation, I place the I/A tip under the pupillary margin across from the incision, lift the pupil slightly off the capsule, and then initiate irrigation. The close proximity of the flow of irrigation to the region under the iris most effectively prevents the problem. A blunt instrument can be used, but material (IOL, capsule, or OVD) should not intervene between the irrigation and the lifted iris. I try to prevent reverse pupillary block by anticipating which patients are at risk (eg, those who have a history of pars plana vitrectomy and high myopes) and use this maneuver to avoid the problem.

No. 4. Protect the Sutures

I recommend techniques to protect the sutures long term such as Hoffman scleral pockets, flaps, or grooves in conjunction with the ab externo passage of sutures to more appropriately locate them. To add to sutures’ longevity, I use either 9–0 Prolene or, better yet, 8–0 Gore-Tex (W. L. Gore & Associates, Inc.)—both off-label uses.

No. 5. Intervene Promptly

I proactively employ specific devices as soon as they will be helpful. This strategy shortens the length of surgery and minimizes additional trauma. In other words, once things start to go downhill, the right tool for the job can expedite the recovery.

No. 6. Record Every Case

Surgeons never know when their next complication will occur, and it can be invaluable to have a recording. After giving themselves time to recover mentally from a difficult case, surgeons should review the video. It is important to be honest without beating up oneself; no one can predict everything that will occur, but everyone can learn from complications that have happened.

Jason Jones, MD, is medical director of Jones Eye Clinic in Sioux City, Iowa, and Sioux Falls, South Dakota. He acknowledged no financial interest in the products or companies mentioned herein. Dr. Jones may be reached at (712) 239-3937; jasonjonesmd@mac.com.