Preventing Extension of a Posterior Capsular Tear

A video report describes the importance of maintaining anterior chamber pressure.

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Posterior capsular tear is a common complication during cataract surgery. Prompt diagnosis and meticulous management are mandatory to prevent extension of the tear and subsequent complications. When a capsular defect is recognized, the appropriate and immediate first reaction should be to stabilize the anterior chamber by injecting an ophthalmic viscosurgical device (OVD) or air before removing the phaco tip or irrigation cannula. Abrupt withdrawal unplugs the incision(s) and allows the anterior chamber to collapse. Subsequently, the sudden posterior pressure gradient can rupture the intact hyaloid face, allowing vitreous to prolapse and the capsular tear to lengthen.

To demonstrate the importance of this first step after identifying a capsular tear, we present a case in which a small posterior capsular tear occurred during irrigation and aspiration. After removing the instruments, without any OVD or air in the anterior chamber, the posterior capsule collapsed and the tear extended tremendously. A video of this complicated case can be viewed at http://eyetube.net/domiw.

CAPSULAR BAG ANATOMY

The capsular bag is the basement membrane of the lens epithelium and is the thickest basement membrane of the body. The fibers of this lamellar structure are arranged parallel to its surface, giving the capsular bag its elastic characteristics. A round tear, such as a capsulorrhexis, will maintain these elastic properties; however, at the first sign of an irregular tear, this elasticity falters, and a small imbalance between the anterior and posterior chambers will enlarge the tear. If a posterior capsulorrhexis were to be made at this point, its elastic properties would be the same as those of an anterior capsulorrhexis.

A posterior capsular tear will enlarge under continu-
ous irrigation due to over-hydration of vitreous, which creates positive vitreous pressure. Therefore, it is important to stop the aspiration as soon after detecting the tear as possible (Figure 1). Immediate removal of the instruments without injecting OVD or an air bubble is not a good idea either, because the anterior chamber pressure will decrease, the vitreous pressure will build, and the tear will enlarge (Figure 2). Other factors that may raise vitreous pressure and aggravate this process include retrobulbar anesthesia, vortex vein pressure, and mechanical pressure of the eyelids.

IDENTIFY THE TEAR

When a posterior capsular tear is identified, it should immediately be plugged with an OVD to avoid pressure drop in the anterior chamber and extension of the capsular tear. While the OVD is injected through a sideport incision, the surgeon should move from footpedal position one (flow only) to zero (no flow or aspiration). The OVD will help to maintain anterior chamber pressure, keep the posterior capsule from bulging forward, and plug the tear. After this immediate acute phase, the OVD should be replaced with a dispersive OVD if one is not already present. Dispersive agents such as Viscoat (Alcon Laboratories, Inc., Fort Worth, Texas) form a barrier between the vitreous and the anterior chamber, preventing fluid egress and making it safe to proceed with surgery. The lower molecular weight of this dispersive agent will avoid prolonged and protracted pressure spikes in the event that small amounts remain in the eye.

 даже a small posterior capsule tear can develop into a large posterior capsular rupture unless the drop in anterior chamber pressure that follows instrument removal is mitigated.

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Figure 2. If instruments are removed without injecting OVD or an air bubble, anterior chamber pressure will decrease, vitreous pressure will build, and the tear will enlarge.