

Hydrodissection-Induced Capsular Rupture With Limited Visibility

BY STEVE CHARLES, MD; BONNIE AN HENDERSON, MD; ALAN KOZARSKY, MD;
AND ALAN N. CARLSON, MD

A 54-year-old man rapidly develops a dense cortical cataract after a pars plana vitrectomy (PPV). The surgeon uses trypan blue in a subsequent cataract surgery to successfully create a continuous curvilinear capsulorhexis. A sudden shallowing of the anterior chamber occurs during hydrodissection, which is followed by a relative deepening of the anterior chamber. Hydrodissection-induced capsular rupture is suspected with visibility limited by a dense cortical cataract. What subsequent steps will most likely lead to a successful outcome?

—Case prepared by Alan N. Carlson, MD.

STEVE CHARLES, MD

As a vitreoretinal surgeon, my comments concern both cataract surgery after a PPV and management of the posterior dislocation of lenticular material if this should occur. Some cataract surgeons believe that posterior capsular rupture is more common after PPV, whereas others disagree with this claim. Prior vitrectomy decreases the risk of retinal detachment, because the anterior movement of vitreous leading to retinal breaks is not an issue. Should posterior dislocation of lenticular material occur, the phaco probe should not be used in the vitreous cavity; the 20-gauge fragmenter is a better option. Proper visu-

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—Steve Charles, MD

alization demands a fundus contact lens or a noncontact visualization system and an endoilluminator. I recommend using three-port, 25-gauge, sutureless PPV and making certain that a complete vitrectomy has been performed. Then, enlarge one sclerotomy to 20 gauge with a microvitreoretinal blade to insert the fragmenter. The lenticular material should be elevated away from the retina with proportional (linear) aspiration and the pedal depressed farther to apply proportional ultrasound. A careful peripheral retinal examination, preferably using contact-based, wide-angle visualization, should be done after the lenticular material is removed to find any retinal breaks, which should be treated with an endolaser and SF₆ gas surface tension management (tamponade).

BONNIE AN HENDERSON, MD

Since this patient most likely has a large linear capsular rupture, there are two options a surgeon may consider at this point: (1) convert to a larger incision for a manual extracapsular extraction, or (2) attempt to phacoemulsify the lens with abundant viscoelastic and a physical

barrier present. This patient's young age and the previous PPV make the second option viable, because the lens will be soft and easily aspirated, and no vitreous will prolapse anteriorly during the removal of the lens. Because of these factors, I would attempt to phacoemulsify the lens but would have a low threshold to convert to a manual extraction.

I would use a dispersive viscoelastic to prolapse the lens out of the bag and into the anterior chamber. Next, I would place a Sheets glide under the lens to prevent posterior dislocation. It would be important to use sufficient amounts of viscoelastic anteriorly to protect the corneal endothelium and posteriorly to prevent the posterior migration of lenticular particles. Next, I would lower the bottle height and flow parameters and carefully aspirate the lens. Care must be taken to avoid breaking off small lenticular particles that might dislocate into the vitreous cavity. Frequent reinjection of viscoelastics would be important to maintain control of the anterior chamber and lenticular particles. Once the lens had been removed, I would use the vitrector with a split irrigation sleeve to remove any residual cortex. Then, I would suture to the iris a three-piece IOL with a rounded anterior edge.

ALAN KOZARSKY, MD

Cataract surgeons must always be aware if a vitreo-retinal surgeon has preceded them into an eye. After a PPV, the cataract surgeon should not be surprised to encounter excessive anterior and posterior movement of the crystalline lens complex, incomplete zonular support, and a compromised lens capsule. In this case, the rapid development of a cataract after a PPV is almost diagnostic of an open capsule.

The positive aspects of this situation include the stained, intact anterior capsule with a continuous capsulorhexis, a soft cortical cataract, and the absence of vitreous. The initial hydrodissection possibly increased the size of the capsular opening and shallowed the anterior chamber via fluid flow into the vitreous cavity. One hopes that the deepening was not due to lenticular material forced through the capsular opening into the vitreous cavity.

The goals going forward are to maintain the integrity of the capsulorhexis and to keep the nucleus and cortex from migrating posteriorly. I recommend that the surgeon use low infusion flow to prevent the posterior displacement of lenticular material and gently remove the nucleus and cortex. When possible, the surgeon should elevate the lenticular remnants from the posterior capsule with a dispersive viscoelastic. Despite the open capsule, the residual lenticular material will not be mixed with vitreous and can be easily and safely removed. The haptics of a three-piece PCIOL can be placed in the ciliary sulcus and its optic captured in the anterior capsulorhexis.

ALAN N. CARLSON, MD

The key and overriding principle eloquently presented by Drs. Charles, Henderson, and Kozarsky is the importance of avoiding vitreous mismanagement. Although it is important to prevent lenticular material from migrating posteriorly whenever possible, it is essential that the surgeon resist chasing this material posteriorly with the phaco handpiece. Some of the early research studying retinal detachment found that an effective way to produce a retinal detachment in an animal model involved using the phaco handpiece in this manner. This is further supported by clinical observations.¹ Recognizing the complexity of some of these cases, it may also be a prudent alternative simply to contact your favorite posterior segment surgeon to safely remove the lenticular material along with vitreous while preserving residual capsule for a sulcus-supported IOL. ■

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1. Aaberg TM Jr, Rubsamen PE, Flynn HW Jr, et al. Giant retinal tear as a complication of attempted removal of intravitreal lens fragments during cataract surgery. *Am J Ophthalmol.* 1997;124(2):222-226.