Treatment of late-onset capsular distension syndrome with a neodymium:YAG laser peripheral iridotomy and anterior capsulotomy

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We describe a new approach to treat late-onset capsular distension syndrome in which the fluid in the capsular bag is cloudy and prevents a posterior neodymium:YAG (Nd:YAG) laser capsulotomy. A peripheral laser iridotomy is created through which the anterior lens capsule peripheral to the IOL optic is accessed. This opening in the iris provides an access point through which an anterior Nd:YAG laser capsulotomy can be performed. Following disruption of the anterior lens capsule, the capsular fluid is released into the anterior chamber and absorbed through the inherent drainage system of the eye. This approach avoids the need for a more invasive surgical intervention.

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Capsular distension syndrome is a relatively rare complication after phacoemulsification with intraocular lens (IOL) implantation in the capsular bag. Essentially, occlusion of the anterior capsulorhexis opening by the IOL optic allows fluid to accumulate in the posterior aspect of the capsular bag. Early in the postoperative period, the retained ophthalmic viscosurgical device creates an osmotic drive and draws fluid into the capsular bag, leading to anterior displacement of the IOL and subsequent myopic shift and narrowing of the anterior chamber angle. Less commonly, months to years after surgery, a similar process can occur, although the mechanism is thought to be secondary to proliferating residual lens epithelial cells. When this process occurs in the late postoperative period, the captured fluid may be opacified and resemble the consistency of milk.

Several techniques to treat capsular distension syndrome have been described. The neodymium:YAG (Nd:YAG) laser can be used to create an anterior or posterior capsulotomy to provide an exit for the accumulated fluid. For an anterior capsulotomy, the iris must dilate beyond the intraocular lens (IOL) optic to allow fluid egress. A posterior capsulotomy can be challenging when the posterior capsule is in the mid-vitreous or the capsular fluid is turbid and opaque. Prior reports have suggested surgical capsulotomy and vitrectomy for cases with a milky appearance, raising concern about possible chronic endophthalmitis. We describe a novel approach to treating patients with late-onset capsular distension syndrome in which the fluid in the capsular bag is cloudy and prevents a traditional posterior Nd:YAG laser capsulotomy.

CASE REPORT

A 59-year-old man had uneventful phacoemulsification and IOL implantation 7 years prior to presentation. He presented complaining of a decrease in vision in the left eye for the past month. On examination, the corrected distance visual acuity was 20/20 in the right eye and hand motions in the left eye; the intraocular pressure (IOP) was 20 mm Hg in both eyes on no ophthalmic medications. In the right
eye, the posterior chamber IOL was well-centered and the posterior capsule was intact. In the left eye, the IOL was well-centered but displaced slightly anteriorly. Posterior to the IOL in the left eye, milky white opaque fluid obscured the view to the posterior pole (Figure 1). A comprehensive ophthalmic examination of the fellow eye was relatively unremarkable. In both eyes, the cataract surgeries were due to age-related nuclear sclerosis and were performed without complication.

Anterior segment imaging using ultrasound biomicroscopy (UBM) showed a distended posterior capsule with an anteriorly displaced IOL (Figure 2). Based on the clinical examination as well as the ultrasound imaging, capsular distension syndrome was diagnosed.

Treatment of this syndrome requires opening the posterior capsular bag. However, in this case, because of the opacity of the fluid, the posterior capsule could not be visualized and opened. Additionally, following maximal pharmacologic dilation, the pupil was 5.0 mm and insufficient to visualize the anterior capsule peripheral to the IOL optic. There was no conjunctival injection, anterior chamber inflammation, or vitritis on echography imaging.

**SURGICAL TECHNIQUE**

To access the anterior lens capsule peripheral to the IOL optic, a laser peripheral iridotomy was created with argon and Nd:YAG lasers. The Nd:YAG laser was then used to create an anterior capsulotomy through the iridotomy. The Nd:YAG laser was applied through the defect in the iris and focused slightly posterior to the iris plane; bursts were fired while the laser beam was slowly advanced posteriorly. The moment the anterior lens capsule was disrupted, the retained turbid fluid in the capsular bag spilled into the anterior chamber (Figure 3).

Postoperatively, the patient was treated with topical timolol 0.5% twice daily as well as topical prednisolone acetate 1.0% ophthalmic solution 6 times daily. The patient noted an immediate improvement in his vision. At 1 week, the CDVA was 20/60 and the IOP 13 mm Hg (Figure 4). The anterior chamber was quiet and postoperative UBM demonstrated the appropriate...
positioning of the IOL–capsular bag complex with the distension resolved (Figure 5). The anterior chamber depth was 3.9 mm. The 0.2 mm increase from preoperatively was not considered clinically significant. The glaucoma drops were stopped, and the topical prednisolone was tapered. At 1 month, the CDVA was 20/40 and the IOP 15 mm Hg on no medication. The CDVA continued to improve to 20/25.

DISCUSSION

Capsular distension syndrome is a rare complication of continuous curvilinear capsulorhexis in which the remaining anterior capsule attaches to the IOL optic and creates a closed chamber. The syndrome can present immediately, early, or late in the postoperative period, and the manifestations can vary from myopic shift and angle closure to the buildup of a turbid white fluid behind the IOL. Many treatment options exist, including the use of pars plana vitrectomy and surgical or Nd:YAG laser capsulotomy in cases with a milky fluid.\(^1\)\(^2\)\(^4\)\(^6\)\(^7\) This aggressive approach has been propagated by reports of *Propionibacterium acnes* in the fluid,\(^5\) although in that case, as in the one we report, there was no anterior or vitreous chamber inflammation to suggest endophthalmitis.

In our approach to a patient with late-onset capsular distension syndrome, poorly dilating pupils, and turbid fluid in the capsular bag, a laser peripheral iridotomy is created, through which the anterior lens capsule peripheral to the IOL optic can be accessed. This opening in the iris provides an access point through which an anterior Nd:YAG laser capsulotomy can be performed. Following successful disruption of the anterior lens capsule, the capsular fluid is released into the anterior chamber and absorbed through the inherent drainage system of the eye. Postoperatively, topical steroids and glaucoma medications should be used. This technique avoids the need for more invasive surgical techniques.

REFERENCES


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