contents

Volume 28, Number 4, April 2002

from the editor

letters

correspondence

consultation section

Cataract Surgical problem, *edited by Samuel Masket, MD*

2. Masket S, Osher RH. Late complications with implant dislocation after capsulorhexis in pseudoexfoliation syndrome. In press, J Cataract Refract Surg
3. Cionni RJ, Osher RH. Management of profound zonular dialysis or weakness with a new endocapsular ring designed for scleral fixation. J Cataract Refract Surg 1998; 24: 1299-1306

* Before trying to find the best method of cataract surgery in a relatively young patient with pseudoexfoliation, 2 points should be considered. First, pseudoexfoliation is a disease of the elderly[1] (mean patient age < 70 years in most clinical studies), and it is uncommon to find young people with the syndrome. Thus, we are seeking a solution for a problem that rarely occurs in clinical practice. Second, the exact pathogenesis of capsular bag dislocation in patients with pseudoexfoliation has not been addressed and needs to be clarified.

During cataract extraction in eyes with pseudoexfoliation, I have 2 goals. First, I try to reduce intraoperative stress on the already compromised zonules as much as possible. Second, I attempt to prevent postoperative capsule contraction syndrome.

I always perform a thorough evaluation of the zonular diaphragm preoperatively and intraoperatively. Although the most important sign of zonular weakness is phakodonesis, reduced anterior chamber depth is also an important clue.

In an eye with pseudoexfoliation only without preoperative zonular weakness, I always use a temporal clear corneal incision because these patients frequendy have or will develop glaucoma in the future; therefore, I try to preserve limbal conjunctiva for possible filtration surgery. I create a capsulorhexis at least 5.5 mm in diameter. A larger capsulorhexis reduces the necessary force for moving the nuclear quadrants out of the capsular bag so I can emulsify the nucleus using lower vacuum and flow settings. I also believe a large capsulorhexis likely reduces the incidence of capsule contraction syndrome.

Three years ago, I began implanting a CTR before proceeding with phacoemulsification of the nucleus in eyes with pseudoexfoliation. This reduces the intraoperative stress that will be exerted on the zonular diaphragm during the later stages of surgery (nuclear emulsification, cortex aspiration, IOL insertion). I initially used CTRs with a 12.0 mm diameter but currently prefer a 14.5 mm diameter ring (model 14 A, Morcher) except in nanophthalmic eyes. It has been shown that CTRs with a larger diameter preserve the capsular bag contour and prevent capsule contraction more effectively than rings with a smaller diameter.[2]

Before CTR insertion, I perform cortical cleaving hydrodissection. This facilitates the aspiration and removal of the entire cortex and eliminates entrapment of the residual cortical fibers between the CTR and capsule equator. After performing hydrodissection, I gently rotate the nucleus and avoid trauma to the zonules.

During nucleus emulsification, I generally use divide-and-conquer or in situ chopping techniques without using high-vacuum and APR settings. This reduces stress on the zonular diaphragm.

I think the IOL material, configuration, and dimensions are also important in reducing or eliminating capsule contraction syndrome in eyes with pseudoexfoliation. Most of the IOLs reported as dislocating into the vitreous were PMMA or silicone.[3] Silicone IOLs are associated with a high incidence of decentration in the capsular bag, anterior capsule opacification (ACO), capsule shrinkage, and capsule contraction syndrome.[4] I routinely implant a hydrophobic acrylic IOL with a 6.0 mm optic, PMMA haptics, 10-degree haptic-optic angulation, and 13.5 mm overall diameter (AcrySof model MA60MB) in patients with pseudoexfoliation. Human autopsy studies show this IOL is associated with the lowest decentration, capsulorhexis opening constriction, capsule shrinkage, and ACO rates of any IOL type including PMMA and silicone.[4] Also, to date no case of dislocation into the vitreous has been reported with the use of this IOL. My experience is similar, and I have not observed a late dislocation or capsule contraction syndrome with this IOL.

If I notice profound zonular weakness, I consider implanting a second CTR, a Cionni-type ring that has suturing holes to fixate the capsular bag to the sclera. In these eyes, the clear corneal incision, capsulorhexis, and hydrodissection stages of the surgery are performed in a similar manner. In eyes with lens instability and extremely weak zonules, I support the whole lens with iris retractors from the edges of the capsulorhexis. I evaluate the zonular diaphragm to assess the extent and location of zonular separation or weakness and then make stab incisions in the peripheral clear cornea and insert retractors to support those weakened areas. Two, 3, or 4 retractors can be used. Then, a regular CTR is inserted

before the nucleus is emulsified. Slow-motion phacoemulsification is performed using the lowest machine settings and divide-and-conquer and in situ chopping techniques. The insertion of a CTR in eyes with profound lens instability can be challenging, and liberal use of viscoelastic material and a ring insertion device are always necessary. Also, a smaller diameter (12.5 mm instead of 14.5 mm) CTR may be considered because it can be inserted more easily.

After nucleus emulsification and cortical cleanup, I implant a Cionni ring (with single or double holes) in the capsular bag and suture it to the sclera. I strongly favor implanting the MA60MB IOL in eyes with very compromised zonules to reduce postoperative capsule contraction syndrome. I do not recommend other implantation sites such as the anterior chamber or ciliary sulcus in these patients. Pseudoexfoliation syndrome is usually associated with glaucoma, and an anterior chamber IOL will worsen IOP control. Insertion of an IOL in the ciliary sulcus does not prevent capsule contraction syndrome, increases uveal contact and BAB disruption, and leads to reduced visual acuity.

In addition to these measures, I recommend regular postoperative follow-up of all pseudoexfoliation patients to detect capsule contraction, ACO, capsule shrinkage, and early signs of bag dislocation. This will allow us to obtain more information about the pathogenesis of this rare complication and the most appropriate measures for its prevention.

ŞÜKRÜ BAYRAKTAR, MD
Istanbul, Turkey

References

1. Bayraktar Ş, Altan T, Küçüksümer Y, Yılmaz OF. Capsular tension ring implantation after capsulorhexis in phacoemulsification of cataracts associated with pseudoexfoliation syndrome; intraoperative complications and early postoperative findings. J Cataract Refract Surg 2001; 27: 1620-1628
2. Lee DH, Lee H-Y, Lee KH, et al. Effect of capsular tension ring on the shape of the capsular bag and opening and the intraocular lens. J Cataract Refract Surg 2001; 27:452-456
3. Jehan FS, Mamalis N, Crandall AS. Spontaneous late dislocation of intraocular lens within the capsular bag in pseudoexfoliation patients. Ophthalmology 2001; 108: 1727-1731
4. Werner L, Pandey SK, Apple DJ, et al. Anterior capsule opacification: correlation of pathologic findings with clinical sequelae. Ophthalmology 2001; 108:1675-1681

* The ideal surgical technique in pseudoexfoliation will minimize stress on zonular fibers, reduce proliferation of LECs, and permit safe, in-the-bag IOL fixation.

Pseudoexfoliation syndrome typically involves a small pupil. Enlargement of the pupil allows better exposure and improved control during surgery. Depending on the degree of papillary miosis, I use a stretching maneuver with the Beehler pupil dilator and viscomydriasis with Healon5 or place a Morcher pupil dilator ring.

Initiation of the capsulorhexis with a pinch type forceps (eg, Rhein capsulotomy-capsulorhexis forceps) equally distributes the stress on the zonules between 2 points 180 degrees apart, an advantage over bent-needle initiation that places all the stress on 1 point.

Gentle yet thorough cortical cleaving hydrodissection serves multiple purposes. Capsular-cortical connections in the capsular fornix are lysed, permitting easy removal of cortex and avoiding the stress of prolonged aspiration with the I/A handpiece. Cortical cleaving hydrodissection also reduces PCO by eliminating LECs. Reduction of LEC bulk may be an important step in preventing late IOL dislocation, as discussed by Jehan and coauthors.[1]

Insertion of a CTR after hydrodissection serves several purposes. The ring distributes forces in the capsule circumferentially, preventing focal stress on zonular fibers. As reported by Bayraktar and coauthors,[2] implanting a CTR before phacoemulsification reduces intraoperative zonular dialysis and increases the rate of capsular IOL fixation. My experience using the CTR confirms increased stability of the capsule during phacoemulsification. In the long term, the CTR may help reduce LEC proliferation by simple compression. The ring may also reduce capsulorhexis contraction by keeping the capsule stretched, eliminating an important source of long-term zonular stress.

Phacoemulsification with the choo-choo chop and flip technique described by Fine and coauthors[3] helps maintain the integrity of the capsule and the zonule by controlling and extracting nuclear material with high vacuum and very low levels of ultrasound energy. Whereas grooving and sculpting generate a force vector in a single direction as the phaco tip moves forward, this counterbalanced chopping technique uses equal and opposite forces with little net effect on zonular fibers. All action takes place in the endocapsular space and the