POSTERIOR CAPSULAR OPACIFICATION

How to reduce the likelihood of this postoperative complication and management considerations.

BY JULIE SCHALLHORN, MD, MS

During cataract surgery, it is impossible to remove 100% of the lens epithelial cells (LECs), and those that remain can cause postoperative capsular contraction and posterior capsular opacification (PCO; Figure). Refinements in IOL design have reduced the likelihood of residual LEC proliferation and PCO, and certain surgical maneuvers can be performed to help reduce the likelihood of capsular contraction.

FUNDAMENTAL 1 IOL HAPTIC DESIGN

Changes in lens haptic design have had the greatest impact on PCO formation. Square-edged optics and haptics are effective at preventing PCO. A systematic review by Oliver Findl, MD, MBA, and colleagues found that the odds ratio of needing an Nd:YAG capsulotomy with a square-edged lens compared to a round-edged lens was 0.25, indicating that square-edged lenses are associated with a PCO rate that is 25% that of round-edged lenses.[1] One-piece IOLs with thick, polished, square-edged haptics and thick, polished, square-edged optics scrape the posterior capsule and can prevent a sheet-like proliferation of the LECs. The downside to this design is that the sharp edge of the haptics can injure other tissues in the eye, so these IOLs are suitable for placement only in the capsular bag, not in the sulcus. All of the acrylic one-piece lenses available in the United States today feature square-edged haptics.

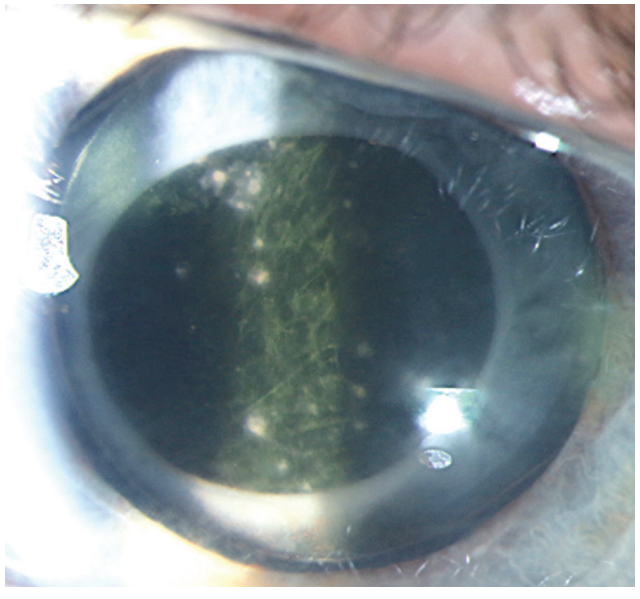

Figure. PCO in a patient with uveitis.

FUNDAMENTAL 2 POLISHING THE POSTERIOR CAPSULE

Polishing the posterior lens capsule can help prevent early opacification by removing any central lens fibers that didn't come off during cortical removal. All of the phaco machines available today feature a low-vacuum capsular polishing setting that is often used in combination with a polymer tip that can gently abrade the residual lens fibers without traumatizing the capsule. Alternatively, a nondisposable diamond-dusted tip may be used to gently abrade the posterior capsule and remove cortical remnants clinging to it.

The keys to effective capsular polishing are to use a low vacuum level, rotate the aspiration port to face the posterior capsule, and make a gentle circular motion to grasp residual LECs and cortical fibers and lift them from the posterior capsule. It is virtually impossible to remove all residual lens fibers from the sulcus of the capsular bag, so some cortical fibers always remain after surgery. Thus, even with polishing, PCO can occur.

FUNDAMENTAL 3 POLISHING THE ANTERIOR CAPSULE

I plan on anterior capsular polishing when placing an accommodating IOL or a nontoric presbyopia-correcting lens. I also perform anterior capsular polishing routinely for uveitic patients because they tend to have higher rates of substantial anterior capsular opacification.

Toric lenses require early capsular adherence to prevent rotation. I generally do not polish the anterior leaflets in the eyes of patients receiving these lenses. The only way to successfully polish the anterior lens capsule is to use a true bimanual I/A system or a capsular polisher. I like the Whitman-Shepherd double-ended capsular polisher (Bausch + Lomb Storz), and this is my preferred approach to polishing the anterior capsule. This double-ended instrument has a round, sharp-edged circle on either end with a 90° angulation. The polisher can be inserted through the main incision, and the angulation of the ring allows it to pass subincisionally. I am often amazed at how much material I can scrape off the anterior lens capsule. It should be noted that this instrument cannot be used to polish the posterior capsule.

FUNDAMENTAL 4 PHARMACEUTICALS

Steroids have an antiproliferative effect on fibroblast cells. Anecdotally, I have noted a low incidence of PCO in patients who have received a fluocinolone intravitreal implant, either fluocinolone acetonide 0.59 mg (Retisert, Bausch + Lomb) or fluocinolone acetonide intravitreal implant 0.18 mg (Yutiq, EyePoint Pharmaceuticals), for the treatment of conditions such as uveitis. This may be due to the steroid's intense suppression of LEC proliferation. Of course, it's not realistic to administer high-dose steroids specifically to prevent PCO, but the observation of reduced PCO indicates the importance of managing postoperative inflammation.

There are also several novel methods for the intracapsular delivery of steroid and antifibrotic agents being developed to help prevent the proliferation of LECs. Nothing is clinically available yet, but I anticipate developments in this area over the coming years.

FUNDAMENTAL 5 ND:YAG LASER CAPSULOTOMY

An Nd:YAG laser can be used to remove the posterior capsule postoperatively. The procedure is minimally invasive and offers high precision and low risk. The risk of PCO is cumulative over time, and a capsulotomy can be performed years after the initial cataract surgery.

In some cases, patients have posterior capsular opacities at the time of surgery that can't be polished off. In this situation, I plan for an early Nd:YAG capsulotomy, typically about 1 month after surgery. By that point, the capsule has contracted somewhat, and it springs open during an Nd:YAG capsulotomy.

Nd:YAG capsulotomy is particularly useful for patients who develop mild PCO after receiving a diffractive multifocal IOL because even subtle capsular opacification can have a significant visual impact on these individuals. In patients with visual complaints after receiving a multifocal IOL, however, it is crucial to determine whether they were happy with their vision before PCO developed prior to proceeding with an Nd:YAG capsulotomy. If they were happy before, then a capsulotomy is likely to resolve the problem. If they were unhappy, another cause of dissatisfaction may be at play, and an Nd:YAG capsulotomy may be contraindicated because an open posterior capsule can make performing an IOL exchange more difficult. ■

1. Findl O, Buehl W, Bauer P, Sycha T. Interventions for preventing posterior capsule opacification. *Cochrane Database Syst Rev*. 2010;(2):CD003738.

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