

Cataract

Surgery in a Quadriplegic Patient

BY ROSA BRAGA-MELE, MED, MD, FRCSC, AND PETER ZAKRZEWSKI, BSC

CASE PRESENTATION

A 51-year-old white obese male presented with bilateral, dense, nuclear sclerotic cataracts. The patient was confined to a wheelchair due to a diving accident 15 years earlier that had rendered him quadriplegic. He could not be transferred from the wheelchair for examination because of his weight and his immobility. His past ocular history was vague because he was unsure about the nature of an injury to his left eye at the age of 6 and of the visual potential in that eye. He was a non-insulin dependent diabetic.

The patient's BCVA was 20/400 OD and hand motions OS. The slit-lamp examination revealed 3+ nuclear sclerosis in the right eye and 4+ brunescient nuclear sclerosis with 2+ posterior subcapsular cataract (PSC) in the left eye. Retinal examination with direct visualization in the right eye and B-scan in the left eye were normal.

We performed uneventful phacoemulsification on the left eye, but upon trying to remove the cortex we found that the patient had a PSC plaque adhering to the posterior capsule that could not be removed with either viscodissection or capsule polishing.

HOW WOULD YOU PROCEED?

1. Due to the patient's quadriplegia and inability to move from his wheelchair to an operating table, how would you suggest the patient be positioned for surgery?
2. In the face of an adherent posterior capsular plaque, how would you proceed with the surgery?
3. Would the patient's quadriplegia and inability to sit at a YAG laser change your management?

SURGICAL COURSE

The patient was taken to the outpatient surgery center by an ambulance service that had been able to winch transfer him from his home onto a stretcher. In the OR, he remained on the stretcher, which we were able to position for surgery. The patient was able to remain in this position immediately after surgery.

We performed successful, uneventful phacoemulsification

through a clear cornea temporal approach. However, after performing routine cortical removal, we found that a posterior plaque was seemingly adherent to the posterior capsule. We unsuccessfully attempted to dissect the plaque with viscoelastic through a free, raised edge of cortex. Our attempts to polish and vacuum the posterior capsule with the aspiration port also failed. Had the patient been mobile or able to sit at the laser, we would have implanted an acrylic IOL and likely performed YAG laser capsulotomy at a later date if needed (at least 6 weeks postoperatively). However, due to the patient's quadriplegia and inability to sit at a slit lamp, we elected to perform a posterior continuous curvilinear capsulorhexis (PCCC). We injected viscoelastic (Amvisc Plus; Bausch & Lomb, Rochester, NY) onto the posterior capsule to flatten it, and we then used a 25-gauge cystotome to raise a flap on the posterior capsule, similar to that performed in an anterior capsulorhexis (Figure 1). We injected the viscoelastic under the flap to push back the anterior hyaloid face (Figure 2), and we used Utrata forceps (Duckworth & Kent Ltd., Hertfordshire, England) to perform a PCCC using a technique again similar to an anterior capsulorhexis (Figure 3). We made the size of the PCCC smaller than that of the anterior capsulorhexis and chose a three-



Figure 1. The authors use a cystotome to initially cut the posterior capsule.



Figure 2. The authors insert viscoelastic behind the first cut in the posterior capsule to push back the anterior hyaloid face.

piece acrylic IOL (AcrySof MA60; Alcon Laboratories, Inc., Fort Worth, TX) for implantation. We placed the haptics of the IOL in the sulcus and fixated the optic into the bag through the anterior capsulorhexis (Figure 4). Finally, we removed the viscoelastic from the eye using vacuum aspiration.

The PCCC, in which a central part of the posterior capsule is removed during cataract surgery, was first proposed by Gimbel in 1990.¹ Its use has since been advocated for preventing postoperative posterior capsule opacification (PCO) in children²⁻⁵ and adults,⁶⁻⁹ removing a posterior capsule plaque discovered intraoperatively,^{7,9-11} and preventing the enlargement of a posterior capsule tear.^{1,10,12}

PCO is the most common complication of cataract surgery; it occurs in 10% to 50% of adult cases¹³⁻¹⁵ and almost all pediatric cases.¹⁶ Performing a YAG laser posterior capsulotomy is the usual therapeutic option for PCO. Although this approach is highly successful, its disadvantages include vision-threatening complications such as increased IOP, increased anterior chamber flare, retinal detachment, and cystoid macular edema, as well as IOL damage, dislocation, or subluxation.^{6,11,23} Other drawbacks include an overall higher cost of cataract extraction^{6,7} and difficulties administering the laser in children and adults who cannot remain still or be appropriately positioned at the laser.^{9,17}

Certain medical conditions have historically necessitated the use of special surgeon-patient positioning during cataract surgery.¹⁷⁻²¹ The case described herein, for example, necessitated a PCCC rather than a YAG laser capsulotomy to prevent PCO.

OUTCOME

Postoperatively, the patient achieved 20/30 uncorrected distance visual acuity, and he is able to see J1 with +2.50 readers. His IOL is well centered, and his IOP remains normal. The patient's postoperative retinal examination was normal.



Figure 3. The authors grasp the posterior capsule with Utrata forceps to make a PCCC.



Figure 4. The authors fixate the optic of the IOL within the capsular bag.

DISCUSSION

Performing a YAG laser capsulotomy is a highly effective treatment for PCO, but, as mentioned before, the technique can be associated with a number of complications and is difficult to perform in patients with medical conditions that preclude appropriate positioning at the laser.

The use of an IOL with a sharp-edged optic has been shown to reduce PCO, but this approach is sometimes insufficient.⁹ Although PCCC has been advocated for prophylaxis against PCO⁶⁻⁹ and been shown to be a safe procedure,^{6,7,9,11} controversy exists regarding its efficacy in preventing PCO.

Recent reports have demonstrated that reclosure of the PCCC can occur by the formation of new tissue within the area.²⁵ Partial and total reclosure occurred in 20% to 55% and in 3% to 20% of cases, respectively, depending on preoperative ocular comorbidities and the type of IOL used.^{9,24,25} Only a minority (five of 147 eyes, or 3.4%) of the patients, however, had visual symptoms that required subsequent treatment (YAG laser capsulotomy or localized vitrectomy) after 6 to 24 months of follow-up. Patients at a higher risk for PCCC reclosure were young adults, those with preoperative uveitis or diabetic retinopathy, and those who had complicated or traumatic surgery.²⁵

Although it requires more surgical skill, performing a PCCC at the time of surgery to prevent PCO is advantageous compared with YAG laser capsulotomy because it avoids positioning problems in patients with medical conditions that make sitting at the YAG laser difficult.

Although we could not find any reports of modified laser techniques to overcome these difficulties, there are several reports in the literature describing modifications of the typical surgeon-patient positioning during cataract surgery necessitated by certain medical conditions. A patient with severe cervical kyphosis was positioned on an orthopedic operating table in a Trendelenburg position,

which lowered his head to 60° above the horizontal and allowed for a reasonable surgical approach.¹⁷ This patient also underwent a PCCC for prevention of PCO in anticipation of difficulties positioning for a YAG capsulotomy. A modified chair allowed patients with COPD and claustrophobia to sit upright during surgery with their heads extended back in the normal supine position.²⁰ Furthermore, performing cataract surgery in a standing position on patients unable to fully recline has been reported using the operating microscope while standing behind the patient,¹⁹ as has using loupes for magnification while standing in front of the patient.²¹

Because our patient required special positioning for cervical kyphosis,¹⁷ we performed a PCCC during surgery to avoid the need for a future YAG laser capsulotomy. Our patient was found intraoperatively to have a posterior capsule plaque, which would have likely developed into symptomatic postoperative PCO. Even if his posterior capsule had been clear, we still would have considered performing a PCCC in order to reduce his risk for developing PCO, especially considering the future difficulties in properly positioning him for a YAG capsulotomy. Because of the relatively safe nature of a PCCC and its efficacy in preventing PCO, we advocate its use during cataract surgery in patients with medical or psychiatric conditions that could impede future administration of a YAG laser capsulotomy. ■

Rosa Braga-Mele, MD, FRCSC, is Assistant Professor at the University of Toronto and Director of Cataract Unit and Surgical Teaching at Mount Sinai Hospital in Toronto. She is a consultant for Bausch & Lomb Surgical, but holds no financial interest in the products mentioned herein. Dr. Braga-Mele may be reached at (416) 462-0393; rbragamele@rogers.com.



Peter Zakrzewski, BSc, is a fourth-year medical student at the University of Toronto. He holds no financial interest in the products mentioned herein. Mr. Zakrzewski may be reached at pete.zakrzewski@utoronto.ca.

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