

Cataract Surgery in Compromised Eyes

Establish pre- and postoperative regimens to obtain optimal results in eyes with uveitis, PXF syndrome, diabetic retinopathy, and AMD.

BY MICHAEL AMON, MD

Cataract surgery in compromised eyes is one of the major challenges faced by ophthalmologists. Sometimes, despite perfect anatomic results, comorbidities within the eye can impair functional vision postoperatively. In order to achieve favorable results in these cases, a thorough intraoperative strategy is mandatory. Below I describe the pre- and postoperative regimen we use at the Academic Teaching Hospital of St. John in Vienna, Austria, and I present considerations for surgery in eyes with complicating conditions such as chronic uveitis, pseudoexfoliation (PXF) syndrome, diabetic retinopathy, and age-related macular degeneration (AMD).

CHRONIC UVEITIS

Diagnostic investigations. Accurate preoperative diagnostic investigations are more important in uveitic eyes than any other. Crucial aspects of care include establishing the indication for surgery at the correct time, choosing an appropriate intraoperative therapy, selecting a nontraumatic surgical technique, finding the optimal IOL, and carefully monitoring the patient postoperatively to identify and treat complications in a timely manner.

Timing of surgery. In patients with chronic recurrent uveitis, cataract surgery should be performed during a disease-free interval, with local and systemic antiinflammatory and immunosuppressive therapies initiated beforehand. Due to advances in treatment of the underlying disease, cataract surgery, and IOL technology, the prognosis of cataract surgery has been improved in these cases. As a result, the indication for cataract surgery can be established earlier in many cases.

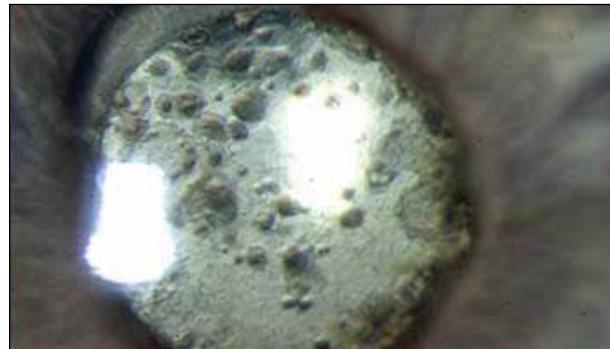


Figure 1. Foreign-body giant cells are seen on the IOL surface in an eye with uveitis.

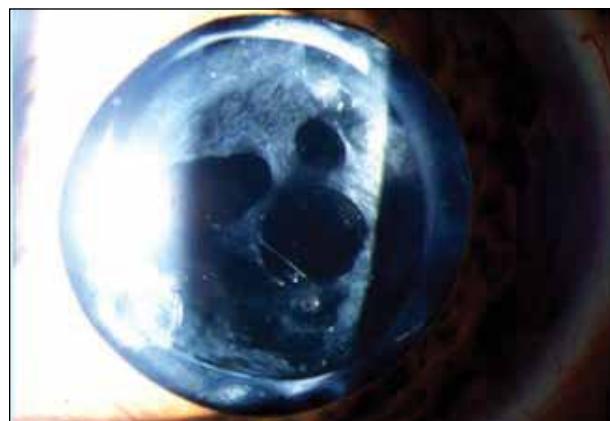


Figure 2. Protein membrane in uveitis.

Phacoemulsification. A standard phacoemulsification technique is appropriate in these eyes, and, as long as it can be performed in a controlled manner, iatrogen-

If the pupil is very narrow, it should be dilated in a dosed manner with the use of a high-viscosity OVD, iris retractors, or a pupil dilation device.

ic pupil dilatation is not necessary. If the pupil is very narrow, it should be dilated in a closed manner with the use of a high-viscosity ophthalmic viscosurgical device (OVD), iris retractors, or a pupil dilation device, rather than performing iridotomy. Pupillary membranes and posterior synechiae should be exposed and removed as completely as possible.

When performing phacoemulsification in eyes with uveitis, the surgeon should anticipate higher rates of miosis and zonulopathy. If there is no red reflex, trypan blue or another dye can be injected to aid in creating a perfectly dimensioned capsulorrhexis that will circumferentially overlap the IOL edge. Phacoemulsification can be combined with vitrectomy if necessary.

Incisions. Because uveitis is associated with a preexisting disorder of the blood-aqueous barrier, it is most important to minimize surgical trauma to avoid additional surgical complications. The incisional technique and location—scleral or corneal—should be determined based on the IOL choice. For diagnostic purposes, a dry tap or biopsy may sometimes be performed to allow further investigation of underlying disease.

IOL selection and implantation. Eyes with uveitis frequently develop recurrent foreign-body giant cells (Figures 1 and 2) and posterior synechiae. These cell membranes produce cytokines that can lead to cystoid macular edema (CME) and functional and optical impairment, and therefore uveal biocompatibility should be a consideration in IOL selection. IOLs with good uveal biocompatibility include those made with hydrogel or modern silicone materials or with heparin-coated hydrophilic surfaces. Foreign-body giant cells develop much less frequently on these types of lenses than on hydrophobic acrylic IOLs. Heparin-coated PMMA lenses were previously the gold standard; today, however, foldable lenses are preferred because they can be implanted through smaller incisions.

In addition to material, lens design can affect outcomes in uveitic patients. The best choice is an IOL that maintains sufficient distance between the iris and lens, thus avoiding synechiae. Additionally, haptic angulation and a sharp-edged optic with narrow optic-haptic junctions are essential design elements to minimize posterior capsular opacification, which is common in the presence of uveitis.

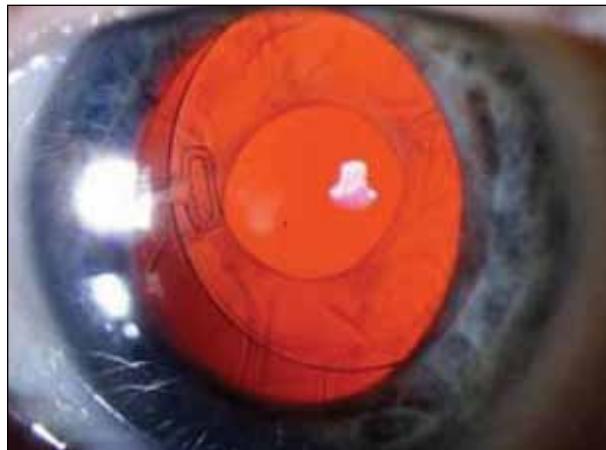


Figure 3. Rhexis phimosis and decentration are common with pseudoexfoliation syndrome.

Aspiration and wound hydration. After IOL implantation, thorough aspiration of OVD remnants is mandatory. I also hydrate the wound to counteract postoperative hypotony, a common and severe complication in eyes with uveitis. In selected cases, corticosteroids can be injected into the vitreous cavity to minimize postoperative inflammation. As in all my cases, I inject intracameral cefuroxime at the conclusion of surgery.

Postoperative regimen. Follow-up care and postoperative regimen largely depend on the individual patient. Typical treatments include topical steroids, NSAIDs, and mydriatic medications, and systemic medications should be prescribed as indicated. Close follow-up of these chronically, recurrently inflamed eyes is mandatory.

PXF SYNDROME

Capsulorrhexis. Because eyes with PXF syndrome are inclined to develop zonulopathy and excessive capsular bag contraction, it is important to create an ideal capsulorrhexis with 360° overlap of the IOL and to avoid over-straining the zonular apparatus during subsequent surgical maneuvers. Implanting a capsular tension ring does not preclude late-onset luxation of the IOL-capsule compartment, but it does make secondary suturing after late-onset luxation easier.

IOL selection. In eyes with PXF syndrome, postoperative inflammation is more severe than in eyes with typical age-related cataract, although less than in those with uveitis. Postoperative alterations of the lens capsule are also more pronounced. For these reasons, it is important to select an IOL with good uveal and capsular biocompatibility. The surgeon can select from any of the available lens materials; however, rhexis phimosis is frequently observed in connection with silicone IOLs (Figure 3), making it important to size the rhexis at 0.5 mm less than the IOL optic diameter.

TAKE-HOME MESSAGE

- Accurate preoperative diagnostic investigations are more important in eyes with chronic uveitis than any other.
- When performing phacoemulsification in eyes with uveitis, the surgeon should anticipate higher rates of miosis and zonulopathy.
- In eyes with PXF syndrome, rhegmatogenous retinal detachment is frequently observed in connection with silicone IOLs.
- When performing cataract surgery in an eye with age-related macular degeneration, reduce light energy transmission by dimming the lights of the microscope and in the operating room.

The appropriate lens design elements for eyes with PXF syndrome are the same as those suggested for use in eyes with uveitis. An additional consideration is that the lens design should allow a nontraumatic implantation technique.

DIABETIC RETINOPATHY

Cataract surgery. Close follow-up and appropriate retinal treatment are crucial in the management of patients with diabetic retinopathy. If follow-up and treatment are impaired by lens opacification, cataract surgery is the only option. As in all other cases, meticulous surgery is mandatory and should include creating a well-sized capsulorrhexis that is sufficient for subsequent laser treatment in the retinal periphery.

IOL selection. In eyes with nonproliferative diabetic retinopathy, the choice of IOL is similar to that in standard cases. Because of a higher incidence of anterior capsular opacification and rhegmatogenous retinal detachment in eyes with proliferative diabetic retinopathy, however, implantation of silicone IOLs should be avoided. Additionally, optical impairment can result because of direct contact between the silicone lens and silicone oil in subsequent retinal surgery.

Combination treatments. Complex pathologic changes often force a surgeon to combine surgical interventions such as laser treatment, vitrectomy, and intravitreal injections with cataract surgery. Creating an optimized and well-timed treatment strategy and practicing close follow-up and interdisciplinary cooperation to control blood glucose levels are keys for achieving satisfying results.

AMD

Cataract surgery. In the presence of AMD, a meticulous cataract surgery technique is necessary to minimize cytokine production and resulting progression of the retinal disease. It also is important to reduce light energy transmission during surgery by dimming the lights of the microscope and in the operating room. Additional measures such as using

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- I have performed combination surgical interventions for concomitant cataract and retinal pathology.

- Yes
 No

- I have combined the following treatments with cataract surgery:

- Laser treatment
 Intravitreal injections
 All of the above
 None of the above

parafoveal fixation, turning off the light between surgical maneuvers, occluding the pupil during some surgical steps, and performing surgery quickly are mandatory.

IOL selection. Generally, use of blue-light-filtering IOLs is debatable, and in my opinion they are especially inappropriate in eyes with profound AMD. Use of sun protection strategies by the patient postoperatively is preferable.

Other considerations. In eyes with dry AMD, obtaining pre- and postoperative optical coherence tomography images is advisable. In eyes with wet AMD and advanced cataract, a combined procedure with injection of a vascular endothelial growth factor inhibitor at the end of cataract surgery may be advisable.

CONCLUSION

A combination of modern IOL technology, a plentiful surgical armamentarium, and a refined surgical skill set will allow surgeons to achieve satisfactory postoperative results in complicated cases such as those described here. Unfortunately, not all IOLs are sufficiently biocompatible for some of these difficult cases, and special attention must therefore be paid to IOL selection. Further education on basic science and implantation techniques is required to achieve optimal results in these compromised eyes. ■

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