

Endoscopic Cyclophotocoagulation and Its Indications in Glaucoma Therapy

A versatile treatment option.

BY BRIAN A. FRANCIS, MD, MS

Endoscopic cyclophotocoagulation (ECP)—the controlled ablation of ciliary processes under direct endoscopic visualization—is unique in the paradigm of glaucoma treatments, because it is the only treatment that suppresses aqueous production. All other surgeries are designed to increase outflow, either by external filtration or internal filtration via angle-based procedures.

ECP offers excellent flexibility. It can be combined with cataract surgery in a patient who has mild-to-moderate glaucoma, or it can be coupled with angle-based procedures. ECP can be performed after trabeculectomy or tube shunts have failed. For end-stage glaucoma, the ECP Plus technique may be an option; aggressive ECP extends into the pars plana and is combined with a limited pars plana vitrectomy via a posterior approach.

ECP AND PHACOEMULSIFICATION

One of the most valuable combinations is ECP and phacoemulsification. Phacoemulsification alone is known to lower IOP, but studies have suggested that combining it with ECP is more successful. A nonrandomized study compared open-angle glaucoma patients who underwent phacoemulsification alone and patients who underwent phacoemulsification in combination with ECP. Although both groups had similar results at 1 year, over time, the IOP in the phaco-only group rose to higher than its starting point, whereas the ECP group maintained a lower IOP throughout the 3-year study period. Seventy-nine percent of the phaco-ECP eyes achieved a long-term decrease in their IOP versus 38% of the

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phaco-only group. Sixty-eight percent of phaco-ECP patients required fewer medications after surgery. In contrast, 89% of phaco-only patients needed the same number of glaucoma medications or more long term. Importantly, adding ECP to phacoemulsification did not seem to change the risk profile?

The combination of phacoemulsification and ECP may also benefit patients with chronic angle-closure glaucoma, plateau iris syndrome, or phacomorphic glaucoma. Because chronic angle-closure glaucoma compromises the outflow system, patients with this condition are not good candidates for angle-based procedures such as Trabectome surgery (NeoMedix Corporation, Tustin, CA) or canaloplasty. ECP is a useful alternative to a trabeculectomy or tube shunts in these patients due to its favorable risk profile. In plateau iris syndrome, the ciliary processes are very large and anteriorly rotated. An ultrasound biomicroscopy study showed that cataract surgery is not curative in these eyes.² By combining the procedure with endoscopic cilioplasty—a modification of ECP—surgeons can shrink the ciliary processes sufficiently to change and open the angle anatomy.

ECP PLUS

ECP Plus is an option for end-stage glaucoma patients in whom multiple glaucoma surgeries and possibly multiple tube shunts have failed. In my experience, when combined with a pars plana vitrectomy via a pars plana approach, ECP of the ciliary processes and posteriorly into the pars plana can reduce the patient's IOP to the single digits in some cases. Due to the distinct angle of approach with this type of ECP, it cannot be performed in phakic eyes. Moreover, because of the aggressive treatment, hypotony is a risk. Therefore, it is important to take particular care when treating patients with neovascular glaucoma or uveitic glaucoma and not to treat 360° of the ciliary processes.

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Spaeth and Uram evaluated the safety and efficacy of ECP Plus in 17 eyes of 12 consecutive patients who had failed an average of 2.5 previous glaucoma surgeries and were at maximum medical treatment. All eyes had a significant decrease in IOP. Eighty-two percent of eyes required fewer medications postoperatively, and 18% needed the same quantity of medications. The safety profile was consistent with that of other glaucoma treatments, with one transient serous choroidal detachment and one dislocated old cortical material with vitrectomy?

ACHIEVING SUCCESS WITH ECP

A key to success in ECP is to treat aggressively. In combined phaco and ECP procedures of eyes with mild-to-moderate glaucoma, I treat as close to 360° as possible. I access as much of the ciliary processes as possible and the areas in between the processes as well, with the goal of ablating as much of the ciliary epithelium as possible. Unlike with some glaucoma procedures, hypotony is generally not a concern with ECP, because from an anterior approach, the entire ciliary process is not reached, eliminating the risk of excessively lowering the IOP. In a combined procedure, it is possible to treat 360° by using the curved probe through the cataract incisions. First, the temporal incision is used, and next, the paracentesis is enlarged, which is 90° away. From this incision, the remaining portion of the ciliary processes can be reached.

With aggressive ECP treatments, I recommend surgeons increase their usual prophylactic treatment for inflammation and cystoid macular edema. ECP combined with phacoemulsification produces more inflammation than

cataract surgery alone. Inflammation can be combated by frequent postoperative steroid drops, topical nonsteroidal anti-inflammatory drugs, or even an intracameral steroid injection at the end of the procedure or a tapering oral steroid dose.

THE SURGICAL ENDOSCOPE

Successfully and confidently performing ECP requires being comfortable when using the endoscope inside the eye. In general, ophthalmologists are accustomed to binocularity with excellent stereoscopic vision when looking through the microscope. With the endoscope, the surgeon is looking at a two-dimensional image on a monitor. It takes time to recognize the different cues that show the instrument's location within the eye. I recommend that surgeons start out conservatively and become more aggressive in their treatments as they gain experience. ECP's efficacy rate will increase along with surgeons' experience and the degree of treatment they employ. Once adept at using the endoscope, ophthalmologists will find ECP to be a fairly straightforward procedure. Another benefit of ECP is that the surgeon can always go back and re-treat the ciliary processes in the case of an initial undertreatment.

I use the E2 surgical laser endoscopy system (Endo Optiks, Little Silver, NJ) in my practice. It gives me a unique outlook on the eye when I am viewing structures within the anterior chamber or in the ciliary sulcus space. As such, I can use this endoscope to facilitate cyclodialysis or iridodialysis repair or goniosynechialysis. I also find the system helpful for looking behind the iris to evaluate capsular support before repositioning or placing IOLs.

CONCLUSION

I have been performing ECP on my glaucoma patients for more than 14 years with consistently successful results. I find that the procedure is a valuable option for the surgical management of glaucoma, whether used alone or performed in combination with other procedures. ■

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