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**OCULAR SURGERY NEWS**

## ECP, alone or with phaco, a safe approach for surgical management of glaucoma

Endoscopic cyclophotocoagulation offers several advantages for both the patient and surgeon.

Ocular Surgery News U.S. Edition, April 25, 2014

Jeffrey T. Liegner, MD

While cataract affects about 22 million Americans age 40 years and older, about 10% of this number, approximately 2.3 million people, are affected also by glaucoma. Lifelong medical treatment of glaucoma, while proven to be effective in the management of IOP in most cases, carries with it a price tag of progressive compromise and potential damage of the normal homeostasis of the ocular surface environment, secondary to the addition of chemicals, especially the preservatives in anti-glaucoma agents.

A healthy ocular surface not only contributes to the ocular comfort associated with normal blinking and tear film spreading effect on the ocular surface by the eyelid windshield wiper effect, it is also a major player in optimal visual acuity. Any deterioration of the corneal surface translates into suboptimal vision and patient discomfort. Hence, in a subset of patients with elevated IOP on glaucoma medications who are scheduled for cataract surgery, the combination of an additional glaucoma surgical procedure packaged into one OR visit at the time of cataract surgery can be a welcome addition, especially if we can eliminate or decrease the use of postoperative glaucoma medications. However, such a combined procedure ideally should be one with a limited potential for complications that is easy to perform and effective in decreasing the IOP, does not cause postoperative pain or discomfort, and has a relatively short learning curve for the surgeon. One such procedure may be endoscopic cyclophotocoagulation.

In this column, Dr. Liegner describes his surgical technique for endoscopic ciliary photocoagulation via an anterior approach at the time of cataract surgery or a pars plana approach for more severe and refractory glaucoma.

Thomas "TJ" John, MD

OSN Surgical Maneuvers Editor



Jeffrey T. Liegner

For decades, trabeculectomy has been the gold standard for incisional treatment of glaucoma. Contrary to the healing forces of the body's reaction to surgery, we have been creating a hole in the sclera that hopefully only partially heals, allowing aqueous to continuously percolate out, thereby reducing IOP through increased outflow. However, the intraoperative surgical risks, the intensive postoperative management and the lifetime risk of endophthalmitis have led many to search for options with higher safety profiles that can be more easily combined with common anterior segment surgeries.

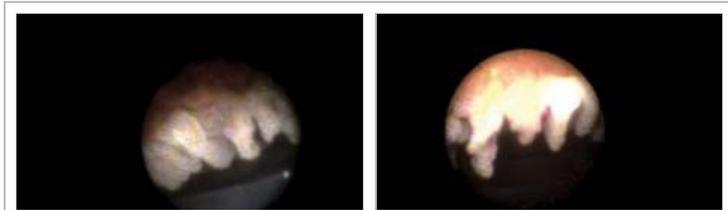
Since 2005, I have integrated endoscopic cyclophotocoagulation (ECP) into my management options for glaucoma and found it to meet many of my criteria for safe surgery: low intraoperative risk, high procedural efficacy, outstanding results, easier postoperative management, and easily combined with cataract surgery or as a stand-alone interventional procedure. Lindfield and colleagues recently published a study of 58 patients who underwent combined phacoemulsification and ECP and confirmed the safety and efficacy of this combination in lowering IOP over cataract surgery alone.

My initial single-port technique, with access to only 220° of anterior ciliary body processes, quickly evolved into a 360° anterior segment treatment using two clear corneal incisions (temporal and medial). To improve access to the ciliary body, I perform ECP after phacoemulsification but before insertion of the IOL because this provides me with an unrestrictive empty capsular bag as well as conserves viscoelastic. Without the IOL physically limiting my posterior movement, I have greater reach and access to the ciliary processes posterior to the immediate ciliary body tips, providing a greater zone of treatment. With the medial clear corneal incision, again using the curved 20-gauge ECP probe, I manage the video's reverse image movement by using a simple one-directional finger twist, allowing a successful treatment to all 360°. This full circumferential anterior treatment protocol has been so effective that I have replaced the 40-plus trabeculectomies performed each year exclusively with ECP and now perform approximately 100 ECP procedures annually, for all primary glaucoma and a wide range of secondary glaucoma types.



Endoscopic view before (A) and after (B) ECP laser treatment of a single shrinking ciliary body.

Images: Liegner JT



A and B, Endoscopic views of ciliary body teeth (processes) before ECP treatment.

For those pseudophakic patients who have had anterior approach ECP (with or without primary cataract removal) and still require an additional procedure to control IOP to below target pressure, I perform "ECP plus" using a pars plana technique. This procedure starts with a two-port 23-gauge pars plana vitrectomy with irrigation via a corneal paracentesis, followed by 360° of ECP of the entire ciliary processes, from the very anterior edge to all the way down onto the pars plana. Typically, the IOP will be single digits for many years after this aggressive intervention. In the last 8 years, I have had only two individuals whose IOP remained above target pressure and required a third intervention: placement of a tube shunt.

### Patient profiles

While 220° of ECP may seem adequate, I find that the results are often underwhelming; given the excellent surgical opportunity to treat more completely, a 360° ECP via two corneal incisions is far superior, easily accomplished and much more effective. A more complete circumferential treatment will add years of more IOP control, reduce further dependence on medication and offer greater stabilization of the optic nerve in both the short and long term.

This more extensive 360° anterior ECP can be applied to a broad selection of patients. Individuals with elevated IOP newly detected, those already on medication and ocular hypertensives without glaucoma damage automatically receive ECP with cataract surgery. Individuals with cataracts and untreated ocular hypertension may or may not be started on a medication preoperatively, but I will perform primary ECP with phacoemulsification to lower their IOP. Additionally, individuals with narrow angles with or without

hyperopia but showing previous glaucoma damage may be candidates for ECP, a supplement to the debulking effect of a primary lensectomy. In these individuals, ECP is effective not only for reducing aqueous production that lowers IOP, but I can also perform posterior peripheral iris iridoplasty, shrinking the posterior tissue and opening up the narrow angle even more, perhaps increasing outflow performance.

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### Adopting a new technique

For newcomers to the ECP procedure, the introductory course offered at most major ophthalmology meetings is excellent. The preferred anterior approach ECP probe is curved, similar to other handpieces we use to manipulate inside the eye, and most ophthalmologists are comfortable using clear corneal temporal access. Across the accessible 220° of ciliary body, the camera and visualization correlate well with probe/hand movement, while the OR nurse circulator adjusts camera orientation. The adaptation to ECP is relatively simple.

To graduate to 360° treatment requires a nasal incision using the same keratome, followed by expanding the subtemporal sulcus with viscoelastic. The probe then has to be inserted using a reverse finger-rolling technique, giving the surgeon the ability to manipulate the instrument in one direction while the camera moves in the opposite direction. This uncoupled view is sometimes challenging, but once you are able to adapt to that, you can simply insert the probe where you left off after the initial treatment (evident by the blanched ciliary body processes) and sweep the remaining area in a continuous fashion, applying the laser as needed.

When considering power settings, the typical starting power is 0.25 W, and I find it is not necessary to exceed 0.35 W. Other points to mention include the necessity of a curved probe rather than a straight probe for an anterior approach, as well as the fact that performing ECP before insertion of the lens conserves viscoelastic. I perform all procedures under topical anesthesia with intracameral lidocaine combined with phenylephrine, with anesthesia supplied as IV fentanyl for comfort during the laser event. As this procedure is associated with increased postoperative inflammation, I treat more aggressively with an anti-inflammatory steroid after surgery.

### Benefits of ECP

Among my patients, treatment with ECP provides myriad benefits. From a physician standpoint, the procedure adds approximately 5 to 7 minutes onto a standard cataract procedure, with no significant change in postoperative care. If operating room value (time) is calculated at \$2,000 an hour, that is a substantial reduction in cost compared with a trabeculectomy concurrently performed with cataract surgery. Postoperative management and office follow-up visits are not different from a standard cataract postop plan. For patients, the most common result is a reduction of one or two ocular hypotensive medications. This results in a substantial cost savings all around, as well as improved patient (and surgeon) quality of life, plus reduced corneal and ocular surface medication toxicity.

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Disclosure: Liegner and John have no relevant financial disclosures.

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