

Point/Counterpoint:

Combining ECP and Cataract Surgery

In many glaucoma patients, endoscopic cyclophotocoagulation is an appropriate treatment option.

BY STANLEY J. BERKE, MD, FACS



US ophthalmologists perform more than 3 million cataract surgeries each year. For the many patients who are also receiving treatment for glaucoma, combining endoscopic cyclophotocoagulation (ECP) with cataract surgery is often an appropriate and effective means of managing the disease.

EVIDENCE

Before 1998, the options for treating patients with glaucoma and cataracts were limited to phacoemulsification or phacotrabeculectomy. Some of the patients on whom I performed phacoemulsification alone experienced a modest decrease in IOP, but most remained on the same number of glaucoma medications. Some patients experienced no change in IOP or even an increase in IOP, necessitating subsequent surgical trabeculectomy. My results are consistent with reports in the literature.^{1,2}

Since 1998, my partners and I have performed more than 1,000 cases of combined phacoemulsification and ECP, primarily in patients with medically controlled glaucoma. We conducted an analysis of our first 25 consecutive cases with 1 year of follow-up.³ In our analysis, 180° treatment of the ciliary processes resulted in a mean decrease in IOP from 20.2 to 17.2 mm Hg (15%) and a reduction in the mean number of glaucoma medications from 1.6 to 0.5 (68%). Patients experienced no visual loss postoperatively and no significant postoperative sequelae.

Another study involving over 1,000 eyes confirms our results and shows no difference in angiographic cystoid macular edema between eyes undergoing phacoemulsification/ECP and phacoemulsification alone (approximately

(Continued on page 28)

There is insufficient evidence that endoscopic cyclophotocoagulation achieves a lasting decrease in IOP.

BY ALAN L. ROBIN, MD



The need for an alternative to filtration surgery is obvious. The problems associated with trabeculectomy include failure, flat chambers, choroidal effusions, endophthalmitis, bleb leaks, and hypotony. To date, however, I have not seen adequate controlled, scientific research in the peer-reviewed literature demonstrating that endoscopic cyclophotocoagulation (ECP) safely produces long-term, positive results with regard to decreasing IOP and, thus, facilitating the management of glaucoma in patients undergoing cataract surgery.

CYCLODESTRUCTION

We have destroyed the ciliary body for many decades in an effort to halt glaucomatous progression. We have burned this tissue with electrodes, frozen it with cryotherapy, and destroyed it with lasers. Among the first to use intraocular lasers in this capacity were Ronald G. Michels, MD; John T. Thompson, MD; and Arun Patel, MD, from the Wilmer Eye Institute at Johns Hopkins University in Baltimore. In patients with intractable glaucoma, they found it necessary to destroy 50% to 60% of the ciliary processes in order to lower pressure adequately.¹ Such damage to the ciliary body breaks down the blood-aqueous barrier, which maintains the homeostatic nature of the eye. Destroying this barrier can cause chronic inflammation and cystoid macular edema. Because of these significant adverse events, one normally reserves destructive procedures as final treatments for glaucoma. We try to be constructive, rather than destructive, in glaucoma therapy.

(Continued on page 30)

(Continued from page 27)

2% in both groups).⁴ Based on our analysis, a typical patient with an IOP of 20 mm Hg on three medications would experience a 3-mm Hg drop in IOP and need only one medication after combined ECP/phacoemulsification. As a result of needing fewer medications, the patient pays less for medication, is at less risk for side effects, and may adhere better to a less complex dosing regimen.

BENEFITS OF ECP

I consider ECP for any patient requiring glaucoma surgery who is a poor candidate for filtration surgery or the placement of a glaucoma drainage device. These patients include those with scarred conjunctivae or whose contralateral eye had trabeculectomy- or bleb-related problems (eg, a flat chamber, chronic choroidal detachment, hypotony).⁵ ECP is also preferable to filtration surgery in eyes where an ocular fistula is undesirable due to elevated episcleral venous pressure, an intraocular tumor, contact lens wear, or blepharitis. The procedure is also more appropriate than filtration surgery in anticoagulated or monocular patients, because it can be performed with topical/intracameral anesthesia.

ECP is faster (adding only 2 to 4 minutes to phacoemulsification) and easier to perform than filtration surgery or the implantation of drainage devices. It involves far fewer postoperative visits and manipulations (eg, laser suture lysis, bleb needling, 5-fluorouracil injections). The procedure is particularly valuable for patients who are unable to make frequent postoperative visits or cooperate for laser suture lysis, suture removal, or other manipulations of the bleb.

The procedure is also titratable. No reports exist of hypotony or phthisis associated with the procedure in my extensive experience or in the 50,000 procedures performed worldwide over the past 10 years. Furthermore, ECP is repeatable. One can treat 360° of the ciliary processes, because only the tips are treated; the “valleys” in between are spared.

Finally, ECP is reimbursable. The CPT code 66711, ciliary body destruction, cyclophotocoagulation, endoscopic is a level II reimbursement, and it more than covers the costs associated with the procedure.

CANDIDATES FOR ECP

I do not perform ECP on every glaucoma patient undergoing cataract surgery. I still choose phacoemulsification alone or combined phacotrabeculectomy in many cases. Generally, I perform 40 cataract surgeries per month, and approximately 10 of the eyes have glaucoma. On average, 25% of the eyes with cataracts and glaucoma undergo phacoemulsification alone, 50% phacoemulsification/ECP, and 25% phacotrabeculectomy.

Generally, if a patient has mild, well-controlled glaucoma

on a single, well-tolerated glaucoma medication, I perform phacoemulsification and IOL insertion through a clear corneal temporal incision. This approach preserves the conjunctiva superiorly, in case the individual needs a trabeculectomy in the future. If a patient has moderate glaucoma and is on two or more medications, I perform phacoemulsification/ECP through a clear corneal incision in an effort to lower the patient's IOP and reduce or eliminate the need for glaucoma medications. Finally, if a patient has advanced glaucomatous cupping and visual field loss on maximum medical therapy (two or more medications), I perform a phacotrabeculectomy with intraoperative mitomycin C.

“ECP should not be considered similar to the transscleral forms of cycloablation, which are ‘blind’ procedures that can cause significant collateral tissue damage.”

CONCLUSION

ECP should not be considered similar to the transscleral forms of cycloablation, which are “blind” procedures that can cause significant collateral tissue damage and result in the over- or undertreatment of the tips of the ciliary processes. In summary, ECP may not be indicated for some of our cataract patients with very mild or very advanced glaucoma. However, it is a simple and easy addition to our armamentarium to treat glaucoma patients with moderate glaucoma on two or more medications. □

Stanley J. Berke, MD, FACS, is Associate Clinical Professor of Ophthalmology and Visual Sciences at the Albert Einstein College of Medicine in New York City and Chief of the Glaucoma Service at Nassau University Medical Center in East Meadow, New York. Dr. Berke is a founding partner of Ophthalmic Consultants of Long Island in Lynbrook, New York. He stated that he holds no financial interest in the technology mentioned herein. Dr. Berke may be reached at (516) 593-7709 ext. 207; sberke@ocli.net.

1. Shingleton BJ, Gamell LS, O'Donoghue MW, et al. Long-term changes in intraocular pressure after clear corneal phacoemulsification: normal patients versus glaucoma suspects and glaucoma patients. *J Cataract Refract Surg.* 1999;25:885-890.
2. Mathalone N, Hyams M, Neiman S, et al. Long-term intraocular pressure control after clear corneal phacoemulsification in glaucoma patients. *J Cataract Refract Surg.* 2005;31:479-483.
3. Berke SJ, Cohen AJ, Sturm RT, et al. Endoscopic cyclophotocoagulation (ECP) and phacoemulsification in the treatment of medically controlled open-angle glaucoma. *J Glaucoma.* 2000;9.
4. ECP Study Group. Comparison of phaco/ECP to phaco alone in 1,000 glaucoma patients: a randomized, prospective study including fluorescein angiography in all patients in both groups. Paper presented at: ASCRS ASOA Symposium on Cataract, IOL and Refractive Surgery; June 2002; Philadelphia, PA.
5. Berke SJ, Bellows AR, Shingleton BJ, et al. Chronic and recurrent choroidal detachment following glaucoma filtering surgery. *Ophthalmology.* 1987;94:154-162.

ALPHAGAN® P

(brimonidine tartrate ophthalmic solution) 0.15%
sterile



INDICATIONS AND USAGE

ALPHAGAN® P is indicated for the lowering of intraocular pressure in patients with open-angle glaucoma or ocular hypertension.

CONTRAINDICATIONS

ALPHAGAN® P is contraindicated in patients with hypersensitivity to brimonidine tartrate or any component of this medication. It is also contraindicated in patients receiving monoamine oxidase (MAO) inhibitor therapy.

PRECAUTIONS

General: Although **ALPHAGAN® P** ophthalmic solution had minimal effect on the blood pressure of patients in clinical studies, caution should be exercised in treating patients with severe cardiovascular disease.

ALPHAGAN® P has not been studied in patients with hepatic or renal impairment; caution should be used in treating such patients.

ALPHAGAN® P should be used with caution in patients with depression, cerebral or coronary insufficiency, Raynaud's phenomenon, orthostatic hypotension, or thromboangiitis obliterans. Patients prescribed IOP-lowering medication should be routinely monitored for IOP.

Information for Patients: As with other drugs in this class, **ALPHAGAN® P** ophthalmic solution may cause fatigue and/or drowsiness in some patients. Patients who engage in hazardous activities should be cautioned of the potential for a decrease in mental alertness.

Drug Interactions: Although specific drug interaction studies have not been conducted with **ALPHAGAN® P**, the possibility of an additive or potentiating effect with CNS depressants (alcohol, barbiturates, opiates, sedatives, or anesthetics) should be considered. Alpha-agonists, as a class, may reduce pulse and blood pressure. Caution in using concomitant drugs such as beta-blockers (ophthalmic and systemic), anti-hypertensives and/or cardiac glycosides is advised.

Tricyclic antidepressants have been reported to blunt the hypotensive effect of systemic clonidine. It is not known whether the concurrent use of these agents with **ALPHAGAN® P** ophthalmic solution in humans can lead to resulting interference with the IOP lowering effect. No data on the level of circulating catecholamines after **ALPHAGAN® P** administration are available. Caution, however, is advised in patients taking tricyclic antidepressants which can affect the metabolism and uptake of circulating amines.

Carcinogenesis, Mutagenesis, and Impairment of Fertility: No compound-related carcinogenic effects were observed in either mice or rats following a 21-month and 24-month study, respectively. In these studies, dietary administration of brimonidine tartrate at doses up to 2.5 mg/kg/day in mice and 1.0 mg/kg/day in rats achieved 86 and 55 times, respectively, the plasma drug concentration estimated in humans treated with one drop of **ALPHAGAN® P** ophthalmic solution into both eyes 3 times per day.

Brimonidine tartrate was not mutagenic or cytogenic in a series of in vitro and in vivo studies including the Ames test, chromosomal aberration assay in Chinese Hamster Ovary (CHO) cells, a host-mediated assay and cytogenic studies in mice, and dominant lethal assay.

Reproductive studies performed in rats with oral doses of 0.66 mg base/kg revealed no evidence of impaired fertility due to **ALPHAGAN® P**.

Pregnancy: Teratogenic Effects: Pregnancy Category B. Reproductive studies performed in rats with oral doses of 0.66 mg base/kg revealed no evidence of harm to the fetus due to **ALPHAGAN® P** ophthalmic solution. Dosing at this level produced an exposure that is 189 times higher than the exposure seen in humans following multiple ophthalmic doses.

There are no adequate and well-controlled studies in pregnant women. In animal studies, brimonidine crossed the placenta and entered into the fetal circulation to a limited extent. **ALPHAGAN® P** should be used during pregnancy only if the potential benefit to the mother justifies the potential risk to the fetus.

Nursing Mothers: It is not known whether this drug is excreted in human milk; in animal studies brimonidine tartrate was excreted in breast milk. A decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother.

Pediatric Use: In a well-controlled clinical study conducted in pediatric glaucoma patients (ages 2 to 7 years) the most commonly observed adverse events with brimonidine tartrate ophthalmic solution 0.2% dosed three times daily were somnolence (50% - 83% in patients ages 2 to 6 years) and decreased alertness. In pediatric patients 7 years of age or older (>20kg), somnolence appears to occur less frequently (25%). Approximately 16% of patients on brimonidine tartrate ophthalmic solution discontinued from the study due to somnolence.

The safety and effectiveness of brimonidine tartrate ophthalmic solution have not been studied in pediatric patients below the age of 2 years. Brimonidine tartrate ophthalmic solution is not recommended for use in pediatric patients under the age of 2 years. (Also refer to Adverse Reactions section.)

Geriatric Use: No overall differences in safety or effectiveness have been observed between elderly and other adult patients.

ADVERSE REACTIONS

Adverse events occurring in approximately 10-20% of the subjects included: allergic conjunctivitis, conjunctival hyperemia, and eye pruritus.

Adverse events occurring in approximately 5-9% of the subjects included: burning sensation, conjunctival folliculosis, hypertension, oral dryness, and visual disturbance.

Events occurring in approximately 1-4% of subjects included: allergic reaction, asthenia, blepharitis, bronchitis, conjunctival edema, conjunctival hemorrhage, conjunctivitis, cough, dizziness, dyspepsia, dyspnea, epiphora, eye discharge, eye dryness, eye irritation, eye pain, eyelid edema, eyelid erythema, flu syndrome, follicular conjunctivitis, foreign body sensation, headache, pharyngitis, photophobia, rash, rhinitis, sinus infection, sinusitis, stinging, superficial punctate keratopathy, visual field defect, vitreous floaters, and worsened visual acuity.

The following events were reported in less than 1% of subjects: corneal erosion, insomnia, nasal dryness, somnolence, and taste perversion.

The following events have been identified during post-marketing use of **ALPHAGAN® P** ophthalmic solution in clinical practice. Because they are reported voluntarily from a population of unknown size, estimates of frequency cannot be made. The events, which have been chosen for inclusion due to either their seriousness, frequency of reporting, possible causal connection to **ALPHAGAN® P**, or a combination of these factors, include: bradycardia; hypotension; iritis; miosis; skin reactions (including erythema, eyelid pruritus, rash, and vasodilation) and tachycardia. Apnea, bradycardia, hypotension, hypothermia, hypotonia, and somnolence have been reported in infants receiving **ALPHAGAN® P** ophthalmic solution.

OVERDOSAGE

No information is available on overdosage in humans. Treatment of an oral overdose includes supportive and symptomatic therapy; a patent airway should be maintained.

DOSAGE AND ADMINISTRATION

The recommended dose is one drop of **ALPHAGAN® P** in the affected eye(s) three times daily, approximately 8 hours apart.

ALPHAGAN® P ophthalmic solution may be used concomitantly with other topical ophthalmic drug products to lower intraocular pressure. If more than one topical ophthalmic product is being used, the products should be administered at least 5 minutes apart.

Rx Only

Revised April 2004

© 2004 Allergan, Inc.
Irvine, CA 92612, U.S.A.

* Marks owned by Allergan

U.S. Pat. 5,424,078; 5,736,165; 6,194,415; 6,248,741; 6,465,464; 6,562,873; 6,627,210; 6,641,834;
6,673,337

9174X
71605US11P

(Continued from page 27)

SUCCESS RATES

ECP does not always adequately lower IOP.

Many patients with glaucoma who have undergone ECP still need additional IOP-lowering medications after combined ECP and cataract surgery. Due to problems with compliance and adherence, this reliance upon medication is not ideal.

“Many patients with glaucoma who have undergone ECP still need additional IOP-lowering medications after combined ECP and cataract surgery.”

CAVEATS

I have not performed ECP. Although I am rarely conservative about new procedures, I hesitate to use ECP, because the potential ill effects of chronic inflammation trouble me. Perhaps a patient with neovascular glaucoma or uveitic glaucoma, who would experience inflammation postoperatively anyway, may benefit from ECP. The procedure may be an acceptable alternative to filtration surgery for some patients, such as those with endophthalmitis in their opposite eye who need cataract surgery as well.

CONCLUSION

ECP is clearly inappropriate in patients with ocular hypotension who have not exhibited glaucomatous changes to their optic discs or visual fields. In these patients, the risk of any intervention is certainly not worth the therapy. Before considering the procedure for my practice, I would like to review prospective results (particularly with regard to safety) from unbiased reviewers in well-controlled studies that compare of combined ECP/cataract surgery with phacotrabeculectomy. □

Alan L. Robin, MD, is Clinical Professor of Ophthalmology at the University of Maryland in Baltimore. Dr. Robin may be reached at (410) 377-2422; glaucomaexpert@cs.com.

1. Patel A, Thompson JT, Michels RG, Quigley HA. Endolaser treatment of the ciliary body for uncontrolled glaucoma. *Ophthalmology*. 1986;93:825-830.