

An Overview of Laser Iridoplasty

This procedure safely widens the angle, and it contributes to the success of other glaucoma procedures.

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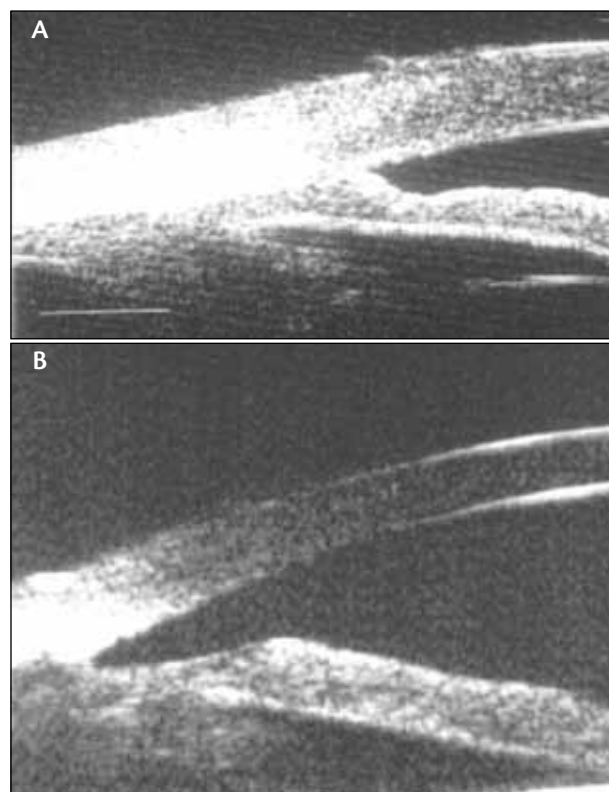
Pioneered by Krasnov as goniotomy in 1977, the technique of using a laser to widen the anterior chamber angle has been refined over time by Kimbrough and others.^{1,2} The effort changed from a penetrating to a slower-burn contraction technique (ie, iridoplasty). This laser-mediated treatment of the peripheral iris is a valuable tool for opening the chamber angle. Iridoplasty is useful as a stand-alone procedure for the treatment of nonpupillary block angle closure. It may also be used adjunctively for pupillary block angle closure and for open-angle glaucoma in the presence of narrow angles. Iridoplasty's benefit for chronic angle closure is controversial, but it appears to reduce the risk of the formation of peripheral anterior synechiae (PAS) after procedures performed on eyes with potentially "occludable" angles.

MECHANISM OF ACTION

The contraction burns of iridoplasty pull the peripheral iris stroma away from the angle structures to deepen the angle recess. Specifically, the application of continuous-wave laser energy causes contracture of the pigmented epithelium of the anterior iris. The heating and shrinkage effect a contracture, thinning, and flattening of the peripheral iris.^{3,4} These changes facilitate mechanical widening of the angle, visualization of the angle structures, and possibly a release of PAS.

INDICATIONS

Iridoplasty effectively treats conditions involving appositional angle closure such as plateau iris,



(All images courtesy of Robert Ritch, MD.)

Figure 1. Ultrasound biomicroscopy of an eye with plateau iris syndrome indicates that the angle is partly open after argon laser peripheral iridoplasty (ALPI), allowing further peripheral treatment (A). Further treatment produces greater thinning of the iris and widens the angle (B).

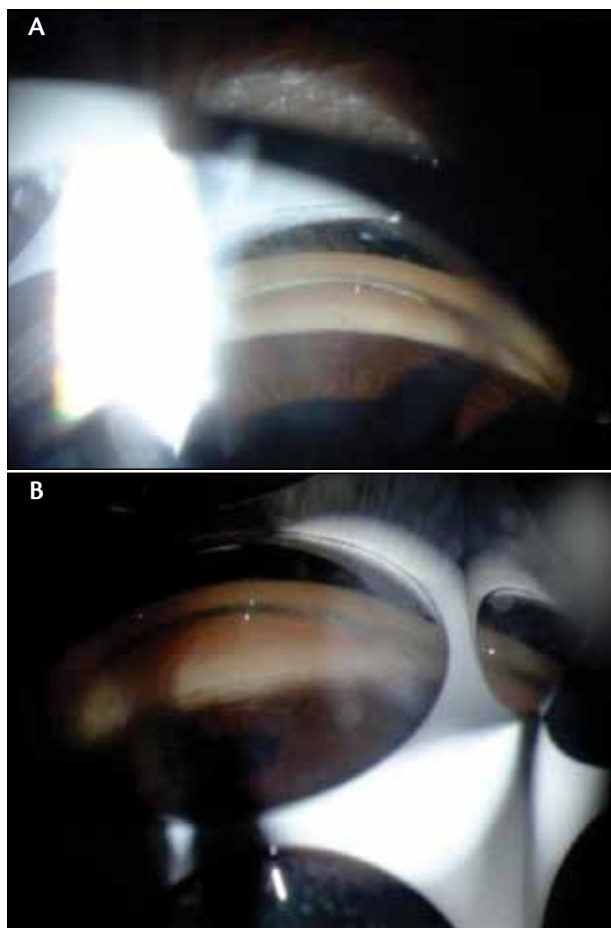


Figure 2. Gonioscopy of an eye with plateau iris syndrome before (A) and after (B) ALPI.

nanophthalmos, and iris cysts. In these cases, crowding of the angle structures blocks aqueous outflow. In plateau iris, there may also be a component of pupillary block, which is initially treated with iridotomy; the residual areas of persistent narrowing are then widened with iridoplasty (Figures 1 and 2). Ritch and colleagues as well as other researchers have demonstrated the long-term successfulness of this approach.^{5,6} Similarly, nanophthalmic eyes experience an age-related increase in the anteroposterior diameter of the lens relative to the eye, which causes appositional closure despite a patent iridotomy.^{3,7} Laser iridoplasty can effectively open the angle in these eyes for many years. Occasional retreatment may be needed in both of these conditions. Iris and ciliary body cysts generally create localized areas of appositional closure, but if these sacs are sufficiently extensive, treatment to widen the angle is needed. Iridoplasty has been shown to have a long-term success rate in these cases.^{8,9}

Acute angle-closure glaucoma can be effectively treated

initially with laser iridoplasty, followed by definitive treatment with laser iridotomy. Several groups have demonstrated the ability of iridoplasty to significantly lower IOP in these eyes, and the effect occurs more rapidly than with medical treatment.^{10,11} Because iridoplasty can be performed despite corneal clouding, whereas iridotomy cannot, initial treatment with the former allows the eye to stabilize and sufficiently clears the surgeon's view to permit definitive treatment.^{10,11} Iridoplasty may also be beneficial for the prevention of PAS formation resulting from prolonged appositional closure in an inflamed eye.⁷

Iridoplasty can effectively open a narrowed angle so as to allow treatment with trabeculoplasty. Moreover, the widening helps to prevent subsequent PAS formation.⁷ Iridoplasty is not indicated for PAS resulting from uveitic glaucoma, however, due to the inflammation the procedure itself incites. It also is not effective in neovascular glaucoma.⁴

TECHNIQUE

Prior to iridoplasty, the surgeon administers pilocarpine 4% to the eye to constrict the pupil, and he or she instills brimonidine to minimize a postoperative pressure spike. Argon laser light is delivered through an Abraham iridotomy lens using a 500- μ m spot size for a duration of 0.5 to 0.7 seconds. Treatment is initiated at 240 mW of power and increased until the surgeon sees the tissue contract. If bubbles form or pigment is released, he or she reduces the power. The aiming beam should be directed as far peripherally as possible, even overlapping slightly onto the adjacent sclera (Figure 3). Placing five to six spots per quadrant, spaced evenly, is appropriate. The surgeon must carefully allow a diameter of two spot sizes between applications and avoid visible blood vessels.^{4,12}

Common errors include placing the spots in the mid-peripheral iris and using a goniolens rather than an iridotomy lens. Both of these mistakes result in a relatively less effective response.^{4,12}

Postoperatively, a drop each of brimonidine and a topical steroid is administered. A course of topical steroids is prescribed so as to reduce inflammation. Generally, prednisolone acetate 1% dosed four to six times per day for 3 to 5 days is sufficient. The postoperative IOP is monitored closely and treated as needed.^{4,12}

COMPLICATIONS

Low-grade inflammation is common after laser iridoplasty and generally responds to topical steroids. Occasionally, the IOP may spike. Intraoperative hemorrhage does not occur due to the low power settings required. Rarely, a dilated pupil with concomitant light sensitivity and/or a cosmetic disturbance may be noticeable, but this condition usually resolves itself over several



Figure 3. An eye with plateau iris syndrome. At the slit lamp, the darkened, round spots indicate the proper placement of ALPI treatment burns in the peripheral iris.

months. Rare cases of iris necrosis have been described, usually related to crowded spot applications.^{4,12}

CONCLUSION

Laser iridoplasty is a safe and effective technique for relieving appositional angle closure. It contributes to the success of other procedures such as iridotomy and trabeculoplasty and provides definitive treatment for select conditions. ■

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