Perfecting the Peripheral Laser Iridotomy

Knowing when to perform LPIs and where to put them may produce better visual outcomes.

BY MARLENE R. MOSTER, MD

Surgeons commonly perform an Nd:YAG peripheral iridotomy (LPI) in patients with pupillary block, those with chronic angle closure, or, more rarely, in pigmentary dispersion syndrome. The purpose of this procedure is to reverse the pupillary block by creating a new drainage pathway for the aqueous. Most surgeons agree that LPI is necessary to resolve acute angle closure, but there may be other situations in which this procedure will benefit the patient. I use several criteria to decide when and where to perform an LPI.

WHEN IS AN LPI NECESSARY?

Overview

I consider performing an LPI when (1) I can barely see the top of the trabecular meshwork without compression or (2) there are peripheral anterior synechiae in the angle. Other factors include the presence of hyperopia and a family history of narrow angles or angle closure. Although it is rare, myopes can develop angle closure and require an LPI, especially if the Von Herrick test shows that the corneal endothelium almost touches the posterior iris. Following are some situations in which I would be likely to perform an LPI.

Case No. 1

The patient is hyperopic, with or without peripheral anterior synechiae, and the angle looks optically closed without compression. The angle opens easily on compression gonioscopy, and I can see either the scleral spur or the ciliary body. The iris typically looks like a balloon or volcano (Figure 1A). An LPI is indicated even if the IOP is normal. A narrow angle, an elevated IOP, and the presence of peripheral anterior synechiae indicates that the diagnosis of angle closure may have been made too late in the process.

Case No. 2

The patient has narrow, optically occludable angles and is taking psychiatric drugs, sleeping pills, antihistamines, anticholinergic drugs for Parkinson's disease, or gastrointestinal medications that have atropine-like side effects. An LPI is indicated because the sympatomimet-

Figure 1. An LPI can create an alternative pathway for aqueous drainage in hyperopic eyes without peripheral synechiae (A); eyes with a unilateral narrow angle from pseudoexfoliation caused by zonular weakness (B); or eyes with large phacomorphic lenses with occludable angles who are poor candidates for cataract surgery (C).

ic effect of these drugs may dilate the pupil and occlude the angle.

Case No. 3

The patient has severe narrowing of the angle and unilateral pseudoexfoliation. The lax zonules caused by the pseudoexfoliation can potentially push the iris anteriorly and cause angle closure (Figure 1B).

Case No. 4

The patient has very narrow angles in conjunction with diabetes or macular degeneration with a frequent need for pupillary dilation.

Case No. 5

The patient has a large, dense, phacomorphic lens pushing the iris diaphragm forward but is not a surgical candidate (Figure 1C). These eyes deserve an LPI to prevent the formation of acute or chronic angle closure.

It is not necessary to perform an LPI in patients who have narrow angles but have a good, deep recess on gonioscopy. These patients just need to be followed with repeat gonioscopy during the year. Patients with a suspected plateau iris should undergo LPI, however, which will remove all aspects of the pupillary block. If the angles are still occludable after the LPI, then the surgeon should consider a diagnosis of plateau iris and discuss a trial of pilocarpine or laser gonioplasty with the patient.

HOW TO PERFORM AN LPI

I prepare patients for an Nd:YAG iridotomy by instilling a drop of proparacaine and apraclonidine (Iopidine; Alcon Laboratories, Inc., Fort Worth, TX) prior to placing the lens in the operative eye. I usually set the laser for between 8 and 10 mJ. Although the location of an LPI can vary depending on the availability of a crypt and the thickness of the iris, the favored placement is between 11 and 1 o'clock. If possible, the iridotomy should be placed where it will be covered completely by the upper eyelid. Very rarely, a small LPI may fill in with pigment and require subsequent revision. Surgeons should not rely on transillumination of the iris alone to assure an iridotomy's patency. Instead, they should perform a slit-lamp examination to ensure a through-and-through opening.

Patients are sent home with instructions to instill a topical steroid every 1 to 2 hours while awake and then four times a day for 4 days before discontinuing the drug.

DETERMINING THE LPI's PLACEMENT

Compared with incisional iridectomy, LPI is less likely to cause complications such as bleeding, infection, a leaking wound, and cataract. Some patients, however, report visual side effects such as ghosting, glare, and transient blurring. Murphy and Trope[1] found that 2.7% (13 of 480) of patients reported monocular blurring or seeing a colored line after undergoing LPI. Upon examination, the investigators determined that the iridotomies in these eyes were partially exposed by the upper eyelid and that the visual disturbances disappeared when the iridotomy was either fully covered or fully exposed.

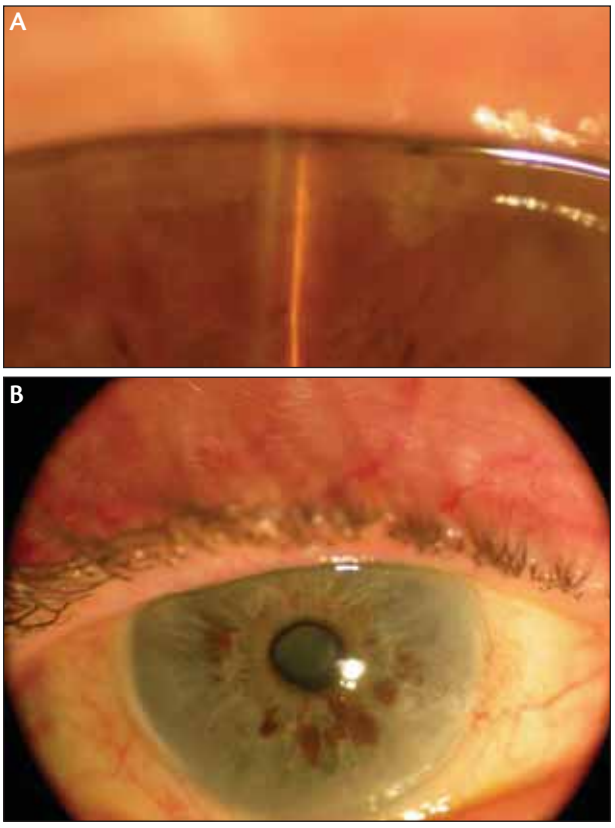

Figure 2. Partially exposed LPIs (A) are more likely to cause visual disturbances such as shadows and lines than LPIs that are completely covered by the superior eyelid (B).

In 2005, my colleagues and I evaluated the frequency of visual disturbances after LPI in relation to the iridotomy's size and position under the eyelid.[2] Our study included 93 patients (172 eyes) who underwent LPI between 1984 and 2003 and 100 control subjects. Fifty-seven of the patients in the control group had glaucoma, and 43 did not.

We administered a standardized questionnaire to both subject groups to determine the incidence of visual disturbances such as halos, lines, crescents, ghost images, glare, spots, shadows, or blurring. We also documented the size and position of the LPIs with a slit-lamp evaluation.

According to the questionnaire, 15% of the eyes in the study group and 66% of the eyes in the control group experienced halos, glare, and blurred vision. The incidence of ghost images and crescents was three times higher among eyes that underwent LPIs. Of note, shadows and lines occurred only in patients with LPIs.

In the study group, LPIs were covered by the upper eyelid in 90 eyes (53%), completely exposed in 40 (23%), and partially exposed in 42 (24%). The highest incidence of visual disturbances was among eyes with partially covered LPIs (26%). Unwanted visual phenomena occurred less frequently with fully exposed (17.5%) and completely covered (8.9%) LPIs. The iris' color did not affect the frequency of visual disturbances.

> "Openings placed outside the 11- to 1-o'clock range are more likely to be partially exposed ... and increase the risk of postoperative visual disturbances."

Currently, no guidelines exist for the optimal placement of LPIs. Our study suggests that openings placed outside the 11- to 1-o'clock range are more likely to be partially or fully exposed by the upper eyelid and thus may increase the risk of postoperative visual disturbances (Figure 2).

CONCLUSION

Even if patients respond well to LPI and do not develop visual disturbances, they should still undergo routine gonioscopy during their follow-up examinations. While examining the angle, the clinician should be able to see the trabecular meshwork and the scleral spur. If not, the angle may be irreversibly closed or have a plateau configuration.

The benefits of an LPI far outweigh the risk of creating one. The visual disturbances noted by some patients can be avoided by placing the LPI either where it is completely covered or completely exposed by the upper eyelid. Even if the patient notes shadows and lines initially, these phenomena should subside over time. ❑

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