ORIGINAL RESEARCH PAPER

Ophthalmology

KEY WORDS: Angle Closure Glaucoma; Laser Peripheral Iridotomy; Intraocular Pressure; Nd:yag Laser

LASER PERIPHERAL IRIDOTOMY – A PROPHYLACTIC MEASURE FOR ANGLE CLOSURE GLAUCOMA

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ABSTRACT

Background: Angle closure glaucoma results from occlusion of the trabecular meshwork by the peripheral iris, obstructing aqueous outflow. Laser peripheral iridotomy (LPI) is the preferred procedure for the spectrum of angle closure disease. Aim: To study the effect of LPI in lowering intraocular pressure (IOP) in patients with primary angle closure glaucoma and the need for trabeculectomy after LPI. Methods: In this prospective observational study, 77 eyes of 40 patients underwent comprehensive eye examination, including visual acuity, applanation tonometry, slit lamp examination, gonioscopy and dilated disc evaluation. Nd:YAG LPI was performed in eyes with occludable angles. IOP was recorded at presentation, 1 week and 4 weeks after LPI, and gonioscopy was repeated at 4 weeks. Results: The mean age was 50.5±2.5 years. Mean IOP fell from 29±17 mm Hg at presentation to 20±10 mm Hg at 1 week and 21±11 mm Hg at 4 weeks, a 27.58% reduction at 1 month. Only 7% of eyes required trabeculectomy, and 40% of patients were stable without antiglaucoma medication after LPI. **Conclusion:** LPI effectively lowers IOP, reduces the need for antiglaucoma medication and trabeculectomy, and is a safe and effective prophylactic measure in primary angle closure glaucoma.

INTRODUCTION

Angle closure glaucoma refers to occlusion of the trabecular meshwork by the peripheral iris, that is, iridotrabecular contact obstructing aqueous outflow. Patients may present with acute symptoms such as severe headache, coloured haloes and a red eye. Signs include closed angles on gonioscopy, a shallow anterior chamber on slit lamp examination and raised intraocular pressure on applanation tonometry.

Primary angle closure disease is classified into three types: primary angle closure suspect, primary angle closure, and primary angle closure glaucoma. This classification is based on IOP, optic disc changes, visual field changes and the presence or absence of peripheral anterior synechiae (PAS) on gonioscopy. Angles found to be narrow on gonioscopic examination should undergo laser peripheral iridotomy, which is the preferred procedure for treating the spectrum of angle closure disease. The lasers most commonly used are the Argon and Nd:YAG lasers.

Aims and Objectives

(1) To study the effect of laser peripheral iridotomy in lowering intraocular pressure in patients with primary angle closure glaucoma.
(2) To study the requirement of trabeculectomy in these patients after laser peripheral iridotomy (LPI).

Materials and Methods

Study design: prospective observational study.

A total of 77 eyes of 40 patients were enrolled. Each patient underwent a comprehensive eye examination comprising visual acuity, tonometry, slit lamp examination, gonioscopy (before LPI and at 4 weeks after LPI) and dilated disc evaluation. Intraocular pressure was measured by applanation tonometry at presentation, at 1 week after LPI and at 4 weeks after LPI. Changes in IOP at each visit and any change in the need for antiglaucoma medication were noted.

Materials used were Snellen's visual acuity chart, an applanation tonometer, a 4-mirror gonioscopy lens, an Nd:YAG iridectomy slit lamp (Figure 1), an Abraham iridotomy lens (Figure 2), lignocaine jelly, proparacaine for topical anaesthesia and pilocarpine eye drops (2–4%).

Procedure: Gonioscopy was done in all primary angle closure patients, and LPI was planned if the angles were found to be occludable (posterior trabecular meshwork not visible for 180 degrees). Pilocarpine 2–4% eye drops were instilled to make the iris taut, and topical anaesthesia was applied. An iridotomy lens was applied to the eye with coupling gel. Defocus was set to 0, the laser was focused on an iris crypt, and power was set at about 2–4 mJ with 2 pulses. A small, 300-micron midperipheral iridotomy was made in the iris between the 11 and 1 o'clock positions. Post-procedure gonioscopy was done to assess opening of the angles.



Figure 1. Slit lamp mounted Nd:YAG laser system.



Figure 2. Abraham iridotomy lens.

RESULTS

The mean age of patients was 50.5±2.5 years; 23 were females and 18 were males. Mean intraocular pressure was 29±17 mm

Hg at presentation, 20±10 mm Hg at 1 week after LPI and 21±11 mm Hg at 4 weeks after LPI (Table 1). This represents a 27.58% reduction in intraocular pressure at the end of 1 month after LPI.

Table 1. Mean intraocular pressure before and after LPI

Time point	Mean IOP (mm Hg)
At presentation	29±17
1 week after LPI	20±10
4 weeks after LPI	21±11

Before LPI, 55 eyes had angles opening up on indentation, of which 45 eyes had open angles without indentation after LPI. Twenty-two eyes had closed angles with PAS, of which 9 eyes had open angles with PAS after LPI, and the remaining eyes had angles opening up on indentation (Table 2). Of the 77 eyes, only 7% required trabeculectomy.

Table 2. Gonioscopic angle status before and after LPI (n = 77 eyes)

Angle status before LPI	Eyes (n)	Status after LPI
Opening on indentation	55	45 eyes open without indentation
Closed with PAS	22	9 eyes open with PAS; remaining open on indentation

After LPI, 40% of patients became stable on no antiglaucoma medication, 17% on one medication and 4% on two medications (Table 3). Of the 77 eyes, 27 had a cup–disc ratio of 0.7 to 0.9, 17 had a cup–disc ratio of 0.5 to 0.7, and 33 had a cup–disc ratio of 0.3 to 0.5.

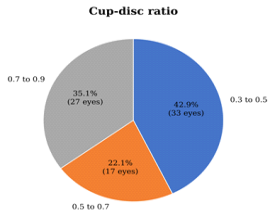


Table 3. Antiglaucoma medication requirement after LPI

Medication status after LPI	Patients (%)
Stable on no medication	40
Stable on 1 medication	17
Stable on 2 medications	4

CONCLUSION

Patent laser peripheral iridotomy decreased intraocular pressure at the end of 1 month, with a reduction in the requirement for antiglaucoma medications and for trabeculectomy, in patients with primary angle closure glaucoma. LPI can be used as a safe and effective prophylactic measure and decreases the need for surgical intervention to control intraocular pressure in these patients.

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