

ROLE OF LASER PERIPHERAL IRIDOPLASTY(LPI) IN PRIMARY ANGLE CLOSURE SUSPECTS(PACS) AND PLATEAU IRIS SYNDROME IN ADJUNCT TO PERIPHERAL LASER IRIDOTOMY

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To study the efficacy of Laser peripheral Iridoplasty (LPI) in treatment of eyes with Primary angle closure suspects (PACS) and Plateau Iris Syndrome who were unresponsive to a previous Laser Peripheral Iridotomy. The goal was to see the combined effect of the two procedures on the improvement of IOP and Anterior Chamber Parameters using ASOCT as a tool for pre and post procedure measurements.

Primary angle closure glaucoma (PACG) is a major cause of blindness worldwide, particularly in the Asian population.¹ Laser peripheral iridotomy is widely accepted as treatment for PACS, primary angle closure (PAC) and PACG eyes, with the aim of relieving pupillary block and reducing further trabecular damage.

Plateau iris configuration refers to an anatomic appearance in which the iris root angulates forward from its insertion in the iridocorneal angle wall and then centrally.²The iris surface appears flat, and the anterior chamber is of relatively normal depth clinically. The cause of the configuration is a large or anteriorly positioned pars plicata, which narrows the angle by physically supporting the iris root against the trabecular meshwork.

Plateau iris syndrome refers to the development of angle closure, either spontaneously or after pupillary dilatation, in an eye with plateau iris configuration despite the presence of

a patent iridotomy.³ Some patients might develop acute angle closure glaucoma despite of iridotomy and may present with raised IOP so, laser peripheral iridoplasty(LPI) which

involves the application of contraction burns (low energy, large spot size, and long duration) to the peripheral iris to prevent acute angle closure post iridotomy in cases of PACS and plateau iris syndrome.⁴

The introduction of anterior segment optical coherence tomography (AS-OCT) has now allowed objective, precise and reproducible quantification of various anterior segment and angle anatomy parameters. AS-OCT allows imaging in the sitting position without the requirement for any contact; it is therefore comfortable for the patient and eliminates any potential anatomical distortion that may result from contact. In addition, AS-OCT evaluates the changes in the angle anatomy after laser iridoplasty.

Materials and Methods

Study Design: Prospective, observational case control study.

Study Group: All patients diagnosed with primary angle closure suspect and plateau iris syndrome who had prior undergone laser peripheral iridotomy. Post iridotomy intraocular pressure and anterior chamber assessment was done with Anterior Segment OCT which did not show much improvement. These patients were then subjected to iridoplasty (LPI) and the change in intraocular pressure and Anterior chamber parameters was documented.

Place: This study was done in Aravind Eye Hospital, Tirunelveli from December 2010-January 2012 and the patients were followed for a mean period of 6 months.

Plateau iris syndrome was diagnosed by the presence of spontaneous appositional angle

closure on darkroom indentation gonioscopy to at least the upper border of the pigmented band of the trabecular meshwork for at least 180° of the angle and an visible iris hump after laser peripheral iridotomy to eliminate pupillary block in eyes with gonioscopically closed angles. Angle chamber parameters were noted with ASOCT.

Patients with other mechanisms contributing to angle closure (e.g., phacomorphic [lens-related] or malignant glaucoma) were excluded. Patients with angle closure secondary to central retinal vein occlusion, panretinal photocoagulation, sclera buckling procedures, posterior scleritis, and other causes of anterior rotation of the lens-iris diaphragm were excluded.

Iridoplasty was performed with topical anesthesia using an Abraham lens after administration of 1 drop of 2% pilocarpine. The laser beam was focused onto the peripheral iris as close to the limbus as possible. The patient was asked to look in the same direction as the quadrant of iris being treated. All 4 quadrants (360°) were treated in the initial procedure. The end point consisted of localized iris contraction at the treated site for each laser application. Immediately after the procedure, the patient was given a drop of topical corticosteroid. One hour after laser, IOP was measured and patients were treated as necessary if an IOP spike had occurred. Patients were treated with topical corticosteroids 6 times daily for 7 days.

Gonioscopy, goldmann applanation tonometry and ASOCT was performed 1 week

later to assess the effect of the procedure. The visual acuity, IOP, angle grading based on the Van Herrick ,gonioscopy, vertical cup-to disc ratio, and the number of antiglaucoma medications were also noted. These parameters before Iridoplasty and at the last follow-up were compared. Supplementary IOP-lowering procedures were noted.

Results

A total of 15 LPI procedures were performed in 15 eyes (8 right eyes, 7 left eyes) in 8 patients (3 men, 5 women). Out of 15 eyes 33.3%(5)eyes had Plateau Iris Syndrome and rest 66.67%(10) were PACS. Mean follow-up time was 6 months . Of the 1 untreated eye, was CRVO with no light perception vision.

Table 1 presents the mean visual acuity, mean IOP, and the mean number of antiglaucoma medications before LPI and at the final follow-up a mean of 6 months after laser.

IOP before LPI and at the last follow-up was significantly decreased from 26.06±7.06 to 17.93 ±4.35mmHg (p<0.0012) The mean number of antiglaucoma medications decreased from 1.27±0.46 to 0.67±1.05.

The mean number of laser applications was 29.2±6.9 (range,19–42). The mean energy level used was 282.7±69.2 mW (range,200–500 mW). The laser spot size was set at 500 µm for 13 of the 15 procedures. In the remaining 2 eyes, which were light gray, the spot size was reduced to 200µm.

Two patients had family history of glaucoma. Of the 15 eyes, 2 eyes were on

Table 1

	Initial Stage	At Last Follow-up
Mean VA ± SD	0.08 ± 0.23	0.08 ± 0.23
	Range (0 -0.78)	Range (0 -0.78)
Mean IOP ± SD	26.07 ± 7.06	17.93 ± 4.35
	Range (18-)	Range (12-26)
Mean AGM ± SD	1.27 ± 0.46	0.67 ± 1.05
	Range (1-2)	Range (0-3)

Bimatoprost at night time after LPI. 3 eyes were using a topical β -blocker and one eye underwent Trabeculectomy to reduce IOP.

Following Iridoplasty, the temporal and nasal angles showed statistically significant increases in the angle parameters. Table 2 shows changes in ASOCT parameters :AOD₅₀₀ increased from $0.136 \pm 0.018\mu\text{m}$ to $0.184 \pm 0.072\mu\text{m}$ ($p < 0.001$), TISA₅₀₀ from $0.088 \pm 0.011\text{mm}^2$ to $0.102 \pm 0.041\text{mm}^2$ ($p < 0.001$), SSA from 20.325 ± 4.35 to 31.77 ± 4.50 ($P < 0.0028$). No significant change in ATA & CLR were found.

Discussion

In 1977, Wand et al differentiated plateau iris configuration from plateau iris syndrome. Classically, plateau iris configuration refers to the pre-iridotomy findings of a normal anterior chamber depth, flat iris plane, and a narrow, or closed, angle. Plateau iris syndrome describes the postiridotomy findings of either spontaneous or dilatation-induced angle closure in patients with plateau iris configuration. However, because of the nature of the anatomic relationships of the structures surrounding the posterior chamber, the degree of relative pupillary block necessary to induce angle closure is less than that necessary in primary angle-closure glaucoma; Pupillary block must be eliminated by iridotomy before plateau iris syndrome can be diagnosed. The important diagnostic criterion is the presence of an occludable angle after iridotomy on the basis of the configuration of the iris on indentation gonioscopy. In our study there was an improvement in the anterior chamber angle parameters (AOD₅₀₀, TISA₅₀₀, SSA) before and

after Iridoplasty and the change was statistically significant. There was no significant change or drop in the visual acuity of the patients who were subjected to Iridoplasty. The study patients showed a significant reduction of Intraocular pressure after the procedure and this was maintained over the follow up period. There was also a significant reduction in the number of antiglaucoma medications before and after the procedure. Only one eye required retreatment as the IOP was not controlled and the patient eventually underwent a Trabeculectomy.

Thus we found LPI to be useful procedure for the treatment of residual appositional closure post Iridotomy in eyes with PACS and Plateau iris syndrome.

To our knowledge, this is the first report of success rate of LPI in the treatment of residual appositional closure after iridotomy in eyes with plateau iris syndrome and primary angle closure suspects with respect to changes in angle parameters based on ASOCT. The results in our patients were highly satisfactory.

REFERENCES

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Table 2

	Pre Iridoplasty Parameters	Post iridoplasty parameters (6 m follow up)	P-value
AOD ₅₀₀	-0.136 ± 0.018	0.184 ± 0.072	<0.001
TISA ₅₀₀	0.088 ± 0.011	0.102 ± 0.04	<0.001
SSA	20.325 ± 4.35	31.77 ± 4.50	<0.0028