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Original Research Article

To study the clinical efficacy of Nd Yag peripheral iridotomy in narrow angle glaucoma

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ABSTRACT

Aim: To examine the clinical efficacy of laser peripheral iridotomy (LPI) in subjects with primary angle closure (PAC).**Materials and Methods:** 134 patients with angle closure glaucoma were included in this retrospective study which was carried out at the glaucoma clinic, department of ophthalmology at DR B.R Ambedkar medical college and hospital over a period of 2 years.**Results:** A total of 134 patients, 268 eyes were participated in this study. All were treated with LPI. The 268 eyes with Successful opening of angle more than 2 for at least 24 weeks. Follow-up ranged from 4 to 24 weeks. Gonioscopy was performed in each visit to confirm the angle status and patency of iridotomy. Success is defined as opening of more than 2 angles ITC for at least 24 weeks, with no need for further medication or laser treatment.

The percentage of open angle at 4 weeks was more 2 angles in 72 eyes(26.9%), ITC>3 angles in 56eyes, (20.9%) and ITC>4 angles in 140 eyes are (52.2%), at 12weeks more 2 angles 48 eyes (17.9%), ITC>3angles in ,60 eyes (20.9%) ITC>4 angles in 160 eyes (59.7%) and 24 weeks was more 2 angles eyes 28 (10.4%), ITC> 3,60 eyes (22.4%) ITC>4 angle in180 (67.2%).

The success rate at 24 weeks ITC more than2 angle was 10.4%, ITC>3angles 22.4% and ITC> 4angles in 67.2% respectively.

In all cases, IOP was measured within 1 hour and IOP elevation of greater than 8 mm Hg was observed in eyes (15.7%). Mild-to-moderate anterior chamber reaction is seen in 128 eyes, hyphema in 12 eyes, ghost images seen in 4 eyes, 4cases of macular edema, cataract progression seen in 32 eyes, and iridotomy in 52 eyes were noted.

Post laser procedure combination of steroid and antibiotic medication was prescribed for 5 days and IOP pressure more 8 mmHg seen in 42 eyes(15.7%), antiglaucoma medications started and oral T. Diamox 250mg 2 tablets were prescribed followed up after 5 days to reassurance.

Conclusions: LPI is an effective treatment option for all patients with in Primary Angle Closure suspect to prevent the acute angle closure glaucoma. LPI is a effective, compliance free, repeatable, most PACS eyes don't receive further treatment and safe therapeutic modality having only minor, transient, self-limiting or easily controlled side effects with no sequelae. Progression to PACG is uncommon in PACS and PAC. Despite our methodology, the inherent limitations of studies should be considered, and conclusion drawn from our pooled results should be interpreted with caution. Future large-volume, well-designed with extensive follow-up are awaited to confirm and update the findings of this analysis.This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.For reprints contact: reprint@ipinnovative.com

1. Introduction

Glaucoma is a condition in which the optic nerve is injured, resulting in irreversible visual loss. Glaucoma can occur at any intraocular pressure, and it is one of the leading causes of glaucoma development and progression.^{1,2}

Angle closure glaucoma is a dangerous illness that causes millions of people to go blind around the world.

Angle closure glaucoma is defined by the presence of appositional or synecheal iridotrabeular contact (ITC).

PACG was found to be present in 4.3 percent of people aged 30 to 60 in Vellore, southern India. All of the PACG cases discovered were chronic, making PACG nearly 5 times more prevalent than POAG.³

Laser peripheral iridotomy is used to treat angle closure glaucoma caused by relative or absolute blockage (LPI). Angle closure glaucoma caused by relative or absolute pupillary obstruction is treated with laser peripheral iridotomy (LPI). LPI eliminates pupillary obstruction by allowing the aqueous to skip the pupil and pass directly from the posterior to the anterior chamber.⁴ LPI can be done with an argon laser, a neodymium:yttrium.

In patients with primary angle closure suspect (PACS) or primary angle closure, a form of laser called Laser Peripheral Iridotomy (LPI) has been found to be a safe and effective method for lowering (intraocular pressure) IOP (PAC).⁵

2. Materials and Methods

A retrospective study design was conducted in the Department of ophthalmology in Dr. BR Ambedkar Medical College and Hospital, between December 2019 and January 2021. no of patients were included in the 135 patients attending the glaucoma clinic.

2.1. Inclusion criteria

All patients who underwent LPI treatment during above mentioned period were included.

2.2. Exclusion criteria

1. Eyes with corneal scar
2. Very shallow anterior chamber
3. Neovascular glaucoma
4. Iridocorneal Endothelial syndrome(ICE)
5. Previous ALT/ SLT patients
6. Uveitis patients.

A detailed history was taken regarding the duration and type of symptoms, systemic associations and treatment taken. Initial evaluation of the patients by history and clinical examination was performed and recorded in patients data collection sheet.

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Classification of Angle Closure Glaucoma.⁶

PAC becomes more likely as the separation between the iris and TM decreases. The risk of iridotrabeular contact at a narrow angle begins to increase once the iridotrabeular angle is less than 20degree. With angle of 20 degrees or less signs of previous closure, such as PAS or iris pigment on the TM should be carefully sought signs of previous closure.

1. Primary Angle closure Suspect (PACS) Two or more quadrants of irido trabecular contact (ITC), normal IOP, no PAS, no evidence of glaucomatous optic neurophathy (GON).
2. Primary Angle closure (PAC) Iridotrabeular contact (ITC) resulting in PAS and / or raised IOP.No evidence of glaucomatous optic neurophathy (GON).
3. Primary Angle closure Glaucoma (PACG).

Iridotrabeular contact (ITC) causing GON: PAS and raised IOP may be absent at the time of initial examination. LPI has been FDA approved and has a proven track record for efficacy.

2.3. Monitoring and follow up

The intraocular pressure (IOP) should be monitored 1 hour after the LPI is completed to ensure that it has not increased. Considerably (i.e., IOP has not risen) by at least 8 mm Hg, and that IOP does not greater than 30 mm Hg).

Topical prednisolone acetate 1% and oral prednisolone acetate 1%.

For 5-7 days, antibiotics are administered four times a day. The patient is seen to have improved after 4 weeks. monitor IOP, to confirm the patency of the iridotomy site by gonioscopy and to check for any significant intraocular inflammation. Repeated laser was performed when the initial LPI was found to be non patent after gonioscopy and anterior segment Oct.

At 12 and 24 weeks, the patient is seen again for a complete examination that includes IOP measurement, slit-lamp examination, gonioscopy, and dilated fundus examination. IOP is also measured after dilation. If IOP rises by more than 8 mm Hg, the anterior chamber angle is still occludable, and the patient must be evaluated for other causes of angle closure (eg, plateau iris).Patients received a argon green laser and Nd:Yag laser during one session as a standard treatment protocol. All LPI procedures were performed by the same glaucoma sub-specialist (AB) using an argon green laser and Q-switched Nd:YAG laser, topical anesthesia and an Abhran Lens. Eyes that were excluded were those who did not complete the LPI treatment or those with corneal disease that inhibited good visualization of the iris.

Data will be extracted from the medical records at baseline visit (pretreatment) and at follow up visit at 24 weeks post treatment. At baseline, the following data are to be obtained from patient records: age, gender,

glaucoma subtype, previous glaucoma treatments, baseline IOP, baseline glaucoma severity (i.e mean deviation (MD) and pattern standard deviation (PSD) on visual field), baseline best corrected visual acuity (BCVA). At 24 weeks follow up, the following data are to be extracted from patient records: current anterior chamber depth and patent of LPI by gonioscopy. Gonioscopy examination revealed that angle deepening had no effect on the need for IOP-lowering medications. Incidence and severity of IOP spikes at 1hour post LPI will be calculated and recorded. All IOP measurements recorded were performed using the standard Goldmann applanation tonometry (GAT). Statistical analysis will be performed using appropriate tests to analyze the data. Several outcome measures will be looked at 24 weeks: opening of angle, success rate, complications and degree of transient IOP rise at 1-hour post procedure.

3. Results

Total of 134 patients were taken.

Total of 268 eyes and 134 patients were taken for the study.

Table 1: Distribution of sex

Gender	Age	Number	%
Male	40-70	48	35.82
Female	40-65	86	64.18

Table 2: Clinical characteristics of eye

Clinical characteristics of eyes	Number	%
Primary angle closure suspect	128	47.76
Primary angle closure	96	35.82
Primary angle closure glaucoma	44	16.41

Table 3: Comparison of post 4,12 and 24 weeks, gonioscopy measurement after LPI

Angle measurement by gonioscopy	4 weeks	%	12 weeks	%	24 weeks	%
Eyes	268		268		268	
ITC>2 angles	72	26.9	48	17.9	28	10.4
ITC>3 angles open	56	20.9	60	22.4	60	22.4
ITC>4 angles open	140	52.2	160	59.7	180	67.2

Table 4: Measurement of IOP post 1 hour

IOP measurement	No of eyes	268	%
Less than 8 mm of hg	226		84.32
More than 8 mm of hg	42		15.68

Table 5: Comparison of post 24 weeks LPI

Complication	No of eye	Percentage
Closure of LPI	52	19.4
Anterior chamber reactions	128	47.76
IOP>8mmHg within hour	42	15.67
Hyphema	12	4.47
CME	4	1.49
Cataract progression	32	11.94
Ghost images	4	1.49

4. Discussion

Globally, 20 million people suffer from primary angle closure glaucoma.

LPI is a typically safe therapy that has a high rate of success in preventing pupil block. Laser iridotomy is most commonly used to treat acute angle-closure glaucoma (AACG).

We wanted to see if laser peripheral iridotomy prevention against PACS was effective and safe.

Although Lpi has been accessible since the 1970s, its role in the treatment of PACS remains controversial: problems like as who should be treated with an iridotomy and whether iridotomy stops disease development remain pertinent today.⁷ LPI is a typically safe therapy that has a high rate of success in preventing pupil block. Acute angle-closure glaucoma (AACG) or PACS caused by relative papillary block are the most common conditions for which laser iridotomy is utilised. Laser iridotomy has the same efficacy as surgical iridectomy, but with less problems, and it can be done in an outpatient setting.⁸ Laser iridotomy has been reported to have a success rate of 65-76 percent,⁹ The length of the follow-up period affects the success rate of laser iridotomy.

The most common treatment for angle closure is YAG LPI, but there has recently been some debate about its capacity to diagnose instances that require iridotomy. Due to a lack of exact diagnostics that can predict the need for an iridotomy, clinical examination is utilised to determine whether an eye needs to be iridotomies.

Only those PACS with a high risk level should be examined for LPI. The preventive impact of LPI was small but significant. The benefit of prophylactic laser peripheral iridotomy for primary angle-closure suspects is restricted due to the low incidence rate of outcomes that pose no immediate threat to vision; consequently, extensive prophylactic laser peripheral iridotomy for primary angle-closure suspects is not indicated.

Primary angle closure glaucoma (PACG) has a higher incidence and prevalence in the Indian and East Asian populations, and it has a higher blinding potential than open angle glaucoma.

This study was unique in that it only included eyes with good visual acuity, normal IOP, no anti-glaucoma

medications, normal VF, and OCT RFNL, and it excluded eyes with a history of previous acute angle closure occurrences. Because there was a link between eyes, the assessment of standard deviations of outcome variables may have been influenced by the inclusion of both eyes of a patient in this study.¹⁰ This study is noteworthy in that it is the first to give information on clinical outcomes following initial PI in patients throughout the entire PACS spectrum.

5. Conclusion

In all stages of primary angle closure suspect (PACS), laser peripheral iridotomy increases angle width and has an excellent safety profile. In individuals with Primary Angle Closure, LPI is an excellent therapy option for preventing acute angle closure glaucoma. LPI is a safe, effective, and compliant therapy method with modest and easily manageable side effects. More large-scale, well-designed investigations with extensive follow-up are needed to confirm and update the findings of this study.

6. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.

7. Source of Funding

None.

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