



SHORT-TERM EFFECTS ON IOP CHANGES IN GLAUCOMATOUS EYES FOLLOWING ND: YAG LASER POSTERIOR CAPSULOTOMY

Ophthalmology

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ABSTRACT

Background: The use of neodymium-doped yttrium aluminium garnet (Nd:YAG) laser procedure for posterior capsulotomy has been gradually replacing the surgical capsulotomy as it is less invasive, and can be performed as an outpatient procedure. **Aim:** To evaluate change in IOP after Nd-YAG LPC. **Patients and methods:** A total of 50 (aged 40-80 years of either sex) pseudophakic patients with best corrected visual acuity (BCVA) symptomatically decreased as a result of opacified posterior capsule with glaucomatous eyes undergoing Nd-YAG LPC were included. Baseline IOP was measured with Goldmann Applanation tonometer and compared with normal range (10-21mm Hg). IOP was also measured at 1 hour, 3 hours, 24 hours, 7 days, and 14 days. **Results:** Twenty-seven left and 23 right eyes were affected. Mean age of the patients was 59.64 years. Half of the patients were elderly (>60 years). Male to female ratio was 1.08:1. The most common type of PCO was pearl (48%). Our study observed a significant improvement in BCVA post-laser ($P<0.0001$). We observed that IOP started increasing up to 3 hours significantly, and became normalized at 24 hours; then started decreasing. Aqueous flares were the most common complications in 21 eyes. **Conclusion:** Nd:YAG capsulotomy is a safe procedure. Since significant pressure spikes occur after laser procedure, it normalizes later.

KEYWORDS

Nd: YAG Laser Posterior Capsulotomy, Intra-ocular Pressure, Best Corrected Visual Acuity

Posterior capsule opacification (PCO) is the most common late complication of uncomplicated cataract surgery which is caused by the proliferation of lens epithelial cells (LECs) that have remained within capsular bag following cataract extraction. Globally, incidence of posterior capsular opacification (PCO) varies in different studies from 7 to 31% for 2 years after the surgery.¹

The central part of posterior capsule is opened either surgically or with laser which is considered as the standard treatment. Nd: YAG laser posterior capsulotomy (LPC) is a convenient and non-invasive procedure that has restricted the need for surgical intervention.²

The most important complication is a transient rise in intraocular pressure (IOP) 1-3 hrs of Nd-Yag LPC.³ Occasionally the pressure rise is high and can cause serious damage to the optic nerve, so that the IOP should be monitored and appropriate measures should be taken if necessary. Only if we can minimize its frequency or, better still, avoid it, altogether, can we accept Nd-Yag L as a safe procedure in our effort to restore vision. In otherwise normal eyes, a mild elevation of IOP is of no consequence because it usually resolves within 24 hours especially when the patient receives anti-glaucoma drugs before and after laser application.

Some glaucomatous eyes may therefore require additional glaucoma therapy for several weeks following Nd-Yag LPC.⁴ So monitoring is particularly important in the cases of glaucoma with optic nerve damage and field loss as these eyes are susceptible to small pressure rises for even a short period. The present study aimed to evaluate change in IOP after Nd-Yag LPC.

Patients and Methods

A total of 50 (aged 40-80 years of either sex) pseudophakic patients with best corrected visual acuity (BCVA) symptomatically decreased as a result of opacified posterior capsule with glaucomatous eyes undergoing Nd-Yag LPC were included at Department of Ophthalmology, Mahatma Gandhi Medical College and Hospital, Jaipur. The study was initiated following approval from institute ethics committee. The patients were included if they agreed to participate into the study.

The patients were excluded if active ocular infection / inflammatory disorder, any corneal pathology or opacification preventing reliable applanation tonometry, history of / or evidence of any posterior

segment pathology, patient of traumatic cataract, patients on long term topical/ systemic steroids, and/or patient on long term topical or systemic anti-inflammatory drugs.

The history of the patients was noted with special regards to the date of cataract operation, presence and type of intraocular lens, medication history including the anti-glaucoma medications and systemic or topical anti-inflammatory agents or steroids. Any history of trauma, diabetes, chronic cough and chest pain was also recorded.

Baseline IOP was measured with Goldmann Applanation tonometer and compared with normal range (10-21mm Hg). IOP was also measured at 1 hour, 3 hours, 24 hours, 7 days, and 14 days.

Data analysis

Data were recorded in to Microsoft® worksheet 2019 and exported into SPSS v21.0. Categorical data were expressed as frequency and percentage, and compared using Chi square test. Quantitative variables were expressed as mean±standard deviation, and compared using paired t-test. P value <0.05 was considered significant.

RESULTS

General characteristics

Twenty-seven left and 23 right eyes were affected. Mean age of the patients was 59.64 years. Half of the patients were elderly (>60 years). Male to female ratio was 1.08:1. The most common type of PCO was pearl (48%) (Table 1).

Table 1: General characteristics

	Frequency	Percentage
Age (Years)		
>60	25	50
≤60	25	50
Sex		
Male	26	52
Female	24	48
Type of PCO		
Pearl	24	48
Fibrous	18	36
Soemmering ring	8	16

Change in BCVA

Our study observed a significant improvement in BCVA post-laser

(P<0.0001) (Table 2)

Table 2: Change in BCVA

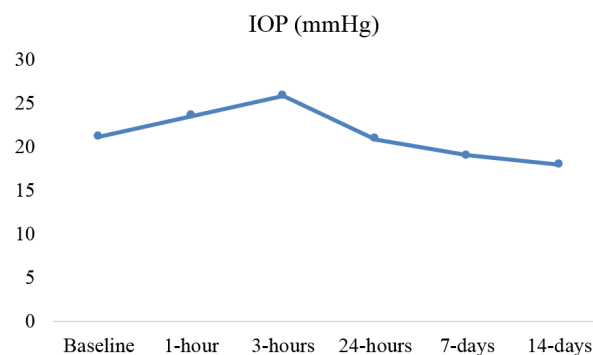
	Pre-laser	Post-laser	P value
6/6-6/18	6	34	<0.0001
6/24-6/60	29	10	
<6/60	15	6	

Change in IOP

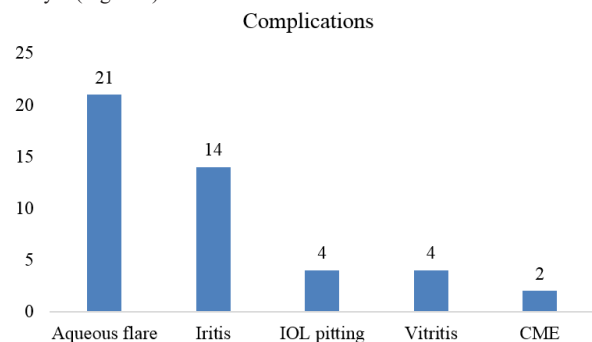
We observed that IOP started increasing up to 3 hours significantly, and became normalized at 24 hours; then started decreasing (Table 3 and Figure 1).

Table 3: Change in IOP

	IOP (mmHg)	P value
Baseline	21.16±3.14	
1-hour	23.58±4.41	<0.0001
3-hours	25.86±4.37	<0.0001
24-hours	20.90±4.46	0.734
7-days	19.08±4.53	<0.0001
14-days	17.96±4.12	<0.0001

**Figure 1: Trends in change of IOP****Complications**

In this study, aqueous flares were the most common complications in 21 eyes (Figure 2).

**Figure 2: Complications****DISCUSSION**

Nd: YAG laser is the most effective procedure for the treatment of PCO. It breaks the capsule following the pressure wave created by infrared light of 1064 nm which is amplified and focused so that electrons are ripped away from nuclei to form energy plasma and corresponding shock wave.⁵

In our study, there was a significant improvement in BCVA after laser capsulotomy. Mohammed Younis et al⁷ reported that 90% of cases after laser capsulotomy procedure showed significant improvement in visual acuity.

We observed that IOP started increasing up to 3 hours significantly, and became normalized at 24 hours; then started decreasing. Our study findings are in concordance with the studies conducted by Ge et al⁷ and Dawood et al⁸ where they concluded transient IOP rise within 1.5- 4 hour and 1-3 hour after laser capsulotomy procedure respectively and then declined towards pre-laser IOP value in their studies.

In conclusion, post laser IOP rise is minimal and transient.

REFERENCES

1. Waseem M, Khan HA. Association of raised intraocular pressure and its correlation to the energy used with raised versus normal intraocular pressure following Nd: YAG laser posterior capsulotomy in pseudophakics. J CPSP. 2010;20(8):524-27
2. Murrell CA, Stanfield DL, Van Brocklin MD. Capsulotomy. Optom Clin. 1995;4: 69-83
3. Ian J. Constable. Arther Siew Ming Lim. Laser its clinical uses in eye diseases. Second edition. 1990.147.148.155.166-170.
4. Kanski JJ. Clinical ophthalmology. A systemic approach. Third edition. 1995.304.305.
5. Bath PE, Fankhauser F. Long-term results of Nd: YAG laser posterior capsulotomy with the Swiss laser. J Cataract Refract Surg. 1986;12(2):150-153
6. Mohammad YK, Jan S, Mohammad NK, Khan S, Kundi N. Visual outcome after Nd: YAG capsulotomy in posterior capsular opacification. Pak J Ophthalmol. 2006;22(2):87-91
7. Ge J, Wand M, Chiang R et al. Long term effect of Nd: YAG laser posterior capsulotomy on intraocular pressure. Arch Ophthalmol. 2000;118(10):1334-1337.
8. Dawood Z, Mirza SA, Qadeer A. Review of 560 cases of YAG laser capsulotomy. J Liaquat Univ Med Health Sci. 2007;6(1):3-7