



EVALUATION OF INTRA-OCULAR PRESSURE AND MACULAR THICKNESS POST ND YAG LASER TREATMENT IN PATIENTS WITH POSTERIOR CAPSULAR OPACIFICATION.

Dr Mehendi Nagda

Junior Resident, Department Of Ophthalmology, B.J.Government Medical College And Sassoon General Hospital, Pune

Dr Satish Shitole

Associate Professor, Department Of Ophthalmology, B.J.Government Medical College And Sassoon General Hospital, Pune

ABSTRACT

Background: - Posterior capsular opacification (PCO), also known as "SECONDARY CATARACT", is one of the most common sequelae following cataract surgery. This can cause a gradual decline in visual acuity and glare. PCO is removed using ND YAG laser. While generally safe, this procedure carries risks such as increased intraocular pressure, cystoid macular edema, and retinal detachment, necessitating careful patient selection and follow-up. **Sample design:** - Hospital-based interventional study. **Purpose:** - Evaluation change of intra-ocular pressure and macular thickness post ND YAG laser treatment in patients with posterior capsular opacification. **Methods:** - We enrolled 50 participants aged between 45 to 75 years, who were evaluated for SECONDARY CATARACT, and subjected them to ND YAG laser capsulotomy. Intraocular pressure using goldmann applanation tonometry and 5 line OCT macula scan was done before, 1 hr after and 1 week after the procedure. All the patients were subjected to pupillary dilatation before the procedure using eye drops Tropicamide (0.8%) + Phenylephrine (5%) and eye drops Ciplox (0.3%) – Dexamethasone (0.1%) 3 times a day for 7 days followed by 2 times a day for 7 days and Timolol (0.5%) 2 times a day for 2 weeks after the procedure. **Results:** - A total of 50 eyes were included. 24% of the patients showed slight rise in intraocular pressure (4mmHg from their base line) which got resolved within 1 week of topical medications and only 4% showed increased macular thickness. **Conclusion:** - The present study depicts the ND YAG laser capsulotomy as a good, successful treatment of PCO because it was found to be modern, non-invasive, effective mode of treatment of PCO with lesser complications and it does not require hospitalization.

KEYWORDS : Neodymium - YAG, laser posterior capsulotomy, intraocular pressure.

INTRODUCTION

Posterior capsular opacification (PCO), also known as "secondary cataract," is one of the most common complications following cataract surgery. It occurs when lens epithelial cells left behind during surgery proliferate and migrate across the posterior capsule, leading to opacification. This can cause a gradual decline in visual acuity, glare, and other visual disturbances, mimicking the symptoms of the original cataract. PCO is not a true recurrence of cataracts but rather a fibrotic or regenerative response of the remaining lens epithelial cells. The standard and effective treatment for PCO is Nd:YAG laser posterior capsulotomy, a non-invasive procedure that creates an opening in the opacified capsule to restore clear vision. While generally safe, this procedure carries risks such as increased intraocular pressure, cystoid macular edema, and retinal detachment, necessitating careful patient selection and follow-up.

The initial intraocular pressure (IOP) spike following an Nd:YAG laser posterior capsulotomy typically occurs within 1 to 3 hours after the procedure and may persist for up to 24 hours in some cases. The increase in IOP can vary depending on factors such as the total laser energy used, the patient's pre-existing ocular condition (e.g., glaucoma), and individual susceptibility. Regular monitoring of IOP within the first 24 hours post-procedure is essential to prevent complications, especially in glaucoma patients or those with compromised optic nerves.

Macular edema following Nd:YAG laser posterior capsulotomy can develop within a few days to weeks after the procedure. However, its duration and resolution depend on various factors, including the patient's underlying ocular condition, the laser energy used, and promptness of treatment. Typically occurs within 2 to 4 weeks post-procedure. It may resolve spontaneously within a few weeks to months. In severe cases or patients with predisposing factors (e.g., diabetes, retinal vein occlusion, or a history of uveitis), it may persist longer and require intervention. In mild cases without significant visual impact, observation may be sufficient. Topical nonsteroidal anti-inflammatory drugs (NSAIDs) or corticosteroids are commonly used. Intravitreal

corticosteroids or anti-VEGF agents may be required for persistent cases. Follow-Up Optical coherence tomography (OCT) is often used to monitor the macula and assess the severity and resolution of edema. Regular follow-ups for 3–6 months post-procedure are recommended, especially for high-risk individuals.

MATERIAL AND METHODOLOGY

This is a hospital based study. The study included 50 eyes; 32 males and 18 females. All patients underwent ND YAG laser posterior capsulotomy. Patients were followed up at 1 hour, 1 day and 1 week. All eyes were diagnosed as PCO with significant reduction of visual acuity. All patients signed an informed written consent for the acceptance of procedure. Visual assessment was conducted by using logMAR. Complete slit lamp examination and detailed fundus examination was done. OCT macula examination and intraocular pressure using goldmann applanation tonometry was done in all the patients. Patients having posterior capsular opacification were subjected to ND YAG laser posterior capsulotomy. Immediate follow up after 1 hour, 1 day, and 1 week of the procedure using goldmann applanation tonometry and OCT macula was repeated.

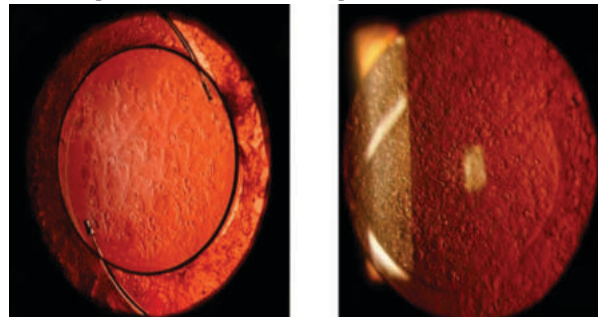


Fig 1 : Elshning pearls type of posterior capsular opacification

RESULTS -

After a short 6 month study following observations were made.

Table 1 – Gender Distribution

| | |
|---------------|----|
| Gender | |
| Male | 32 |
| Female | 18 |
| Total | 50 |

Table 2 – Diabetics vs non - diabetics

| | |
|----------------|----|
| Diabetic | 03 |
| Non – diabetic | 47 |
| Total | 50 |

Table 3 – Comparison of intraocular pressure

| | |
|------------------------------|--------------|
| Intra-ocular pressure | |
| Pre-procedure | 17.9 +/- 1.2 |
| 1 hr post procedure | 19.6 +/- 0.9 |
| 1 day post procedure | 19.2 +/- 1.1 |
| 1 wk post procedure | 18.4 +/- 1.0 |

Table 4 – Complications

| | |
|-----------------------------|----|
| Complications | |
| Increased IOP | 12 |
| Pitting | 2 |
| Iritis | 3 |
| Increased macular thickness | 2 |
| Total | 19 |

Table 5 – Type of PCO

| | |
|--------------------|----|
| Type of PCO | |
| Elschnig pearls | 24 |
| Fibrous | 14 |
| Wrinkling | 12 |
| Total | 50 |

Table 6 – Rise of IOP

| | | | |
|--------------------|-------------|--------------|-------------|
| Rise in IOP | 1 hr | 1 day | 1 wk |
| No rise | 38 | 48 | 50 |
| 1 – 5 mm Hg | 11 | 2 | - |
| 6 – 10 mm Hg | 01 | - | - |

Table 7 – Macular thickness after the procedure in diabetics vs non - diabetics

| | | |
|--------------------------|-----------------------|-----------------|
| Macular thickness | Non – diabetic | Diabetic |
| Pre – procedure | 247 +/- 0.9 | 249 +/- 1.07 |
| 1 wk post procedure | 253 +/- 1.5 | 270 +/- 0.7 |

A total of 50 patients were included in the study. Among them, 32 (64%) were male and 18 (36%) were female, with a male-to-female ratio of 1.8:1. Systemic evaluation revealed that 3 patients (6%) were diabetic. The mean intraocular pressure (IOP) showed a transient elevation following the procedure. The baseline IOP was 17.9 ± 1.2 mmHg. This increased significantly to 19.6 ± 0.9 mmHg at 1 hour post-procedure (p < 0.001), followed by a slight decrease to 19.2 ± 1.1 mmHg at 1 day (p = 0.0003 compared to baseline). By 1 week, the IOP reduced to 18.4 ± 1.0 mmHg, which was not significantly different from baseline (p = 0.14). Overall, the change in IOP across time points was statistically significant. Also, at 1 hour post-procedure, a rise in intraocular pressure (IOP) was noted in 12 patients (24%). Of these, 11 patients (22%) had a mild rise (1–5 mmHg), and 1 patient (2%) had a moderate rise (6–10 mmHg). By post-procedure day 1, the IOP had normalized in most cases, with only 2 patients (4%) showing a mild rise (1–5 mmHg). At 1 week, none of the patients exhibited any rise in IOP, indicating resolution in all cases. These findings suggest that transient IOP elevation is relatively common within the first hour after the procedure but typically resolves without intervention by the first postoperative week. Macular thickness was assessed pre-procedure and one week post-procedure in both diabetic and non-diabetic patients. Among non-diabetic patients, the mean macular thickness increased from 247 ± 0.9 μm to 253 ± 1.5 μm. In diabetic patients, the thickness increased from 249 ± 1.07 μm to 270 ± 0.7 μm, which was also statistically significant (p = 0.0002). These findings indicate a significant increase in macular thickness post-procedure in being more pronounced in diabetic patients.

CONCLUSION

The most common post operative complication of cataract extraction was posterior capsular opacification, which in turn caused deterioration of visual acuity. The NDYAG laser capsulotomy is a safe and effective method to treat posterior capsular opacification. It is a non-invasive and avoids all the complications of surgical capsulotomy. IOP rise was the most common complication of NDYAG laser. Rise in IOP was maximum after 1 day after the procedure , which was normalized within 7 days after procedure. Increased macular thickness is a very rare complication and mostly restricted to diabetics which requires aggressive management.

REFERENCES

1. Aslam TM, Devlin H, Dhillon B. Use of Nd: YAG laser capsulotomy. *Surv Ophthalmol.* 2003;48(6):594–612.
2. Schaumberg DA, Dana MR, Christen WG, Glynn RJ. A systematic overview of the incidence of posterior capsule opacification. *Ophthalmology.* 1998;105(7): 1213–1221. doi:10.1016/S0161-6420(98)97023-3
3. MacEwen CJ, Dutton GN. Neodymium-YAG laser in the management of posterior capsular opacification—complications and current trends. *Trans Ophthalmol Soc U.K.* 1986;105(Pt 3):337–344.
4. Arya SK, Sonika KS, Kumar S, Kang M, Sood S. Malignant glaucoma as a complication of Nd: YAG laser posterior capsulotomy. *Ophthalmic Surg Lasers Imaging.* 2004;35(3):248–250. doi:10.3928/1542-8877-20040501-14.
5. Silverstone DE, Brint SF, Olander KW, Taylor RB, McCarty GR, Burk LL. Prophylactic use of apraclonidine for intraocular pressure increase after Nd: YAG capsulotomies. *Am J Ophthalmol.* 1992;113(4):401–405.
6. Ozkurt YB, Sengor T, Evciman T, Haboglu M. Refraction, intraocular pressure and anterior chamber depth changes after Nd: YAG laser treatment for posterior capsular opacification in pseudophakic eyes. *Clin Exp Optometry.* 2009;92(5):412–415. doi:10.1111/j.1444-0938.2009.00401.x
7. Weiblinger RP. Review of the clinical literature on the use of the Nd: YAG laser for posterior capsulotomy. *J Cataract Refract Surg.* 1986;12(2):162–170. doi: 10.1016/S0886-3350(86)80034-7
8. Shah GR, Gills JP, Durham DG, Ausmus WH. Three thousand YAG lasers in posterior capsulotomies: an analysis of complications and comparison to polishing and surgical dissection. *Ophthalmic Surg.* 1986;17(8):473–477.
9. Raza A. Complications after Nd: YAG posterior capsulotomy. *J Rawalpindi Med Coll.* 2007;11:27–29.
10. Kraff CM, Sauders DR, Liebermann HL. Intraocular pressure and the corneal endothelium after Nd: Yag laser posterior capsulotomy. Relative effects of aphakia and pseudophakia. *Arch Ophthalmol.* 1985;103:511–14.
11. Ge J, Wand M, Chiang R, Paranhos A, Shields B. Long-term effect of Nd:YAG laser posterior capsulotomy on intraocular pressure. *Archives of Ophthalmology.* 2000;118(10):1334–37
12. Shani L, David R, Tessler Z, Rosen S, Schneck M, Yassur Y. Intraocular pressure after neodymium : YAG laser treatments in the anterior segment. *Journal of Cataract and Refractive Surgery.* 1994;20(4):455–58.
13. Ari S, Cingü AK, Sahin A, Çınar Y, Çaçı I. The effects of Nd: YAG laser posterior capsulotomy on macular thickness, intraocular pressure, and visual acuity. *Ophthalmic Surg Lasers Imaging.* 2012;4