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Study of Intraocular Pressure Variation after ND YAG Laser Capsulotomy in Pseudophakic Patients

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Abstract : *Posterior capsular opacification (PCO) is an important cause of diminution of vision after cataract surgery. Nd YAG laser capsulotomy is a safe, non invasive procedure of choice for PCO. Raised intraocular pressure(IOP) is a frequent complication after Nd YAG laser capsulotomy. But is usually a transient complication. So this study is conducted to find rise in IOP after Nd YAG laser capsulotomy.*

Materials and methods : *A total of 50 Pseudophakic (PCIOL) patients with a complaints of diminution of vision with PCO were selected for the study. IOP rise after Nd YAG laser capsulotomy was measured with Applanation tonometry. Statistical analysis was done using t test.*

Results : *On statistical analysis, Mean IOP pre procedure 11.98 mm Hg and Mean IOP 2h post procedure 12.98 mm Hg. On applying t test differance in IOP was significant ($p<0.05$). On follow up visits rise in IOP was normalized to pre procedure levels.*

Conclusion : *In our study, it was observed that all Pseudophakic patients may not require anti glaucoma medications pre and post Nd YAG laser capsulotomy. If there is a persitant rise in IOP on follow up visits then anti glaucoma medications may be advised.*

Keywords: *Capsulotomy, Glaucoma, IOP, PCO, Pseudophakia.*

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I. Introduction

Cataract is a major cause of blindness in India, which accounts for 62.6% of all other causes of blindness[1]. Manual small incision cataract surgery (SICS) and phacoemulsification are the most commonly performed cataract surgeries. Posterior capsular opacification (PCO) is important cause of diminution of vision after successful cataract surgery. Its frequency varies from 7-31% by 2 years after cataract surgery[2]. Standard treatment for posterior capsular opacity consists of making an opening in the central part of posterior capsule [3]. Nd YAG laser posterior capsulotomy is the treatment of choice for PCO. Nd YAG laser capsulotomy is a safe, effective and less time consuming procedure. But it is associated with common complications such as intraocular pressure (IOP) rise, hyphema, cystoid macular edema (CME), corneal haze, uveitis, intraocular lens (IOL) pits and retinal detachment. IOP rise is most frequent of all[4]. So this study was conducted to find rise in IOP after Nd YAG laser capsulotomy.

II. Materials And Methods

A total of 50 Pseudophakic Patients with PCO, attending Department of Ophthalmology KVG Medical College and Hospital, Sullia were selected for the study for a period of 4 months from November 2017 to February 2018. Approval from hospital ethical committee was obtained and informed written consent taken from all participants.

Small incision cataract surgery with Pseudophakia (PCIOL) with PCO with no other complications was included in the study. SICS with other types of IOL (ACIOL, Scleral fixated IOL, Iris claw), trauma, glaucoma, uveitis, corneal diseases, retinal diseases, trabeculectomy, high myopia and systemic illness with hypertension and diabetes were excluded from study.

Patients were thoroughly evaluated before procedure in the form of visual acuity testing, IOP recording with Applanation tonometry, dilated fundus examination with direct ophthalmoscope, indirect ophthalmoscope and slit lamp biomicroscopic examination was done. Post Nd YAG laser, IOP recorded immediately after procedure, 2 hrs after procedure and 1 week after procedure.

After putting local anesthetic drops (Proparacaine hydrochloride 0.5%), with or without capsulotomy lens, 3 to 4 mm central capsulotomy with inferior based capsular flap was performed with minimum energy and fundamental mode.

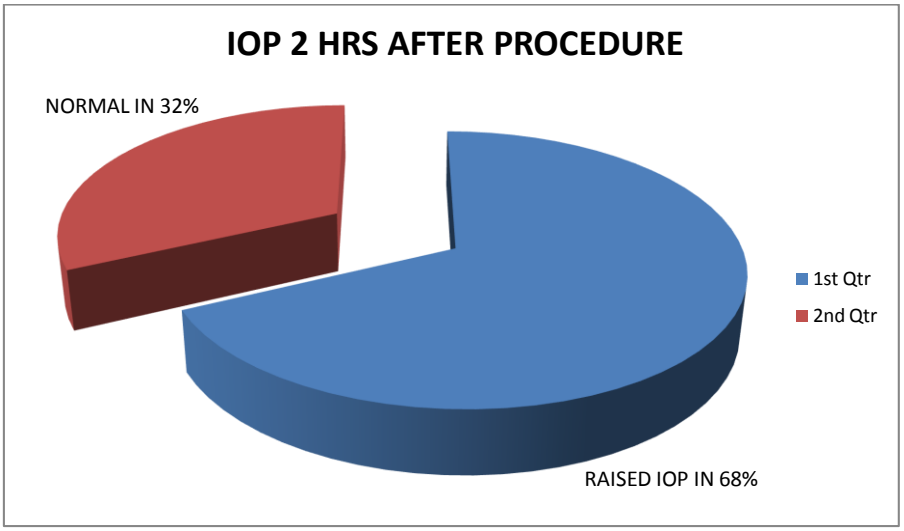
Post Nd YAG laser slit lamp examination to see for capsulotomy opening size, position and also to see for anterior chamber cells and flare, IOL pits was done. Statistical analysis was done using t test.

III. Results

Table no 1 – Mean IOP in mm Hg, t value and P value

	Pre procedure IOP	Immediately after procedure	2 Hrs after procedure	7 days after procedure
Mean IOP +/- S.D in mm Hg	11.98+/- 2.20	12.04 +/- 2.21	12.98+/- 2.35	12.04+/- 2.20
t value		0.1361	2.1966	0.1364
P value		0.8921	0.034	0.8918
Significance		Insignificant	Significant	Insignificant

In our study, gender distribution out of 50 patients 56% were male and 44% were female. As per this table, Mean IOP Pre procedure was 11.98+/- 2.20 mm Hg, immediately after procedure 12.04+/- 2.21mm Hg, 2Hrs after procedure 12.98+/- 2.35 mm Hg, 7 days after procedure 12.04 +/- 2.20 mm Hg. P value was found to be insignificant between Preprocedure and immediately after procedure, and also between Preprocedure and 7days after procedure. P value was significant (<0.05) between Preprocedure IOP and 2 Hrs after procedure IOP. Compared to Preprocedure IOP, immediately after procedure IOP is also raised but is found to be insignificant. This shows that IOP recording is important 2 Hrs after procedure. P value is insignificant 7 days after procedure. This shows that raised IOP is transient which normalizes over a period of 1 week.



IV. Discussion

In our study of 50 patients, 32(64%) were male and 28 (36%) were females. Amongst them 64% were between ages of 50-70 years. This was commonest group to undergo cataract surgery. In similar with a study by Shetty NK et al., 60% were males and 40% were females[5].

In our study no significant change in IOP was found immediately after procedure. But 2 hrs after procedure, rise in IOP was found significant. IOP was again recorded after 7 days, however rise in IOP was insignificant after 7 days. This shows that rise in IOP was transient complication, which normalizes over a period of 7 days.

In study by Shetty NK et al., observed all patients had rise in IOP 2 hrs post procedure irrespective of number of shots. Hence IOP documentation 2hrs after procedure was observed to be more predictive of persistent rise in IOP compared to immediate post procedure IOP. However we didn't compare number of shots used for performing procedure but we also found rise in IOP 2 hrs after procedure.

In a study by Manav Singh, Nidhi Sharma et al., the rise of IOP from base line to 1 hour, 3 hour, 5 hour and 24 hours post procedure was not found to be significant in the groups receiving ocular hypotensive drug. In the group receiving placebo, the rise of IOP reached statistical significance at 1,3 and 5 hours post laser which

came down to insignificant levels at 24 hrs[6] . However we didn't use any ocular hypotensives, we also found rise in IOP 2 hrs after procedure.

In a study by Kraff et al., found post Nd YAG capsulotomy, IOP rise was lesser in Pseudophakics as IOL blocked cortical material from reaching trabecular meshwork and clogging with particulate matter[7] .

Nd YAG laser capsulotomy can cause short and long term IOP elevations. The underlying mechanism to this IOP rise after Nd YAG laser capsulotomy remains unclear. Proposed mechanisms include effects to ciliary body caused by the laser shock waves, neurohumoral increase in the IOP, structural effects of laser energy on sodium hyaluronate of the vitreous and finally mechanical blockage of trabecular meshwork with debris from disrupted posterior capsule[8,9]. However our study could not find exact mechanism of rise in the IOP.

Higher elevation of IOP after large capsulotomy shows that size of capsulotomy is a important factor in deciding the IOP rise, probably due to release of inflammatory products[6]. However our study didn't compare size of capsulotomy with rise in IOP.

Hence rise in IOP after Nd YAG laser capsulotomy is due to release of inflammatory mediators which is maximum at 2 hrs. Our study did not notice any persistent elevation of IOP requiring anti glaucoma medications.

V. Conclusion

Nd YAG laser capsulotomy is the best treatment modality for PCO. Nd YAG capsulotomy is a easy OPD based procedure but it has finite complications. IOP rise is most frequent complication of all. Rise in IOP is maximum at 2 hrs after procedure. This will be normalized within 7 days after procedure. However we didn't compare number of shots used for performing procedure and also energy used for procedure. Hence we conclude that all Pseudophakic patients undergoing Nd YAG capsulotomy needs IOP monitoring. If IOP becomes normal within 7 days of procedure, patients may not require anti glaucoma medications.

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