

## Study of Intra Ocular Pressure changes after ND:YAG LASER Capsulotomy in Patients with Pre Procedure Timolol(0.5%) eyedrop and without Timolol (0.5%) eyedrop.

Parth leuva<sup>1\*</sup>, Nilesh Parekh<sup>2</sup>, Shankar Ganvit<sup>3</sup>, Niyant Pandya<sup>4</sup>

<sup>1</sup>Senior Resident Doctor, <sup>3</sup>Associate Professor, <sup>4</sup>Professor and Head, Department of Ophthalmology, S.S.G. Hospital and Medical College, Vadodara. <sup>2</sup>Professor and Head, Department of Ophthalmology, Sir T Hospital and Medical College, Bhavnagar.

### ABSTRACT

**BACKGROUND:** To study the efficacy of pre procedure topical Timolol(0.5%)eyedrop in preventing post procedure Intraocular pressure(IOP) rise in eyes undergoing ND:YAG CAPSULOTOMY. **MATERIALS AND METHODS:** A Prospective Open Labelled Randomised Comparative study conducted in 50eyes, over a period of 5months.Pre capsulotomy baseline IOP by Goldmann Applanation Tonometer (GAT) , Slitlamp Examination, Dilated fundus Examination, Best corrected visual acuity testing was done.After instilling a test medication ND: YAG CAPSULOTOMY performed. Post capsulotomy patients were assessed immediately, 1 hour, 24 hour, 48 hour, 1 week, 2 week for IOP. **RESULT :** Precapsulotomy, mean IOP in group A ( use of pre procedure timolol eyedrop ) was 12.88±2.011 mmHg as compared to 13.96±2.26 mmHg in group B ( without pre procedure timolol eyedrop ). However after capsulotomy mean IOP at 1hour in group A was 13.08±3.06 mmHg as compared to 14.48±1.96 mmHg in group B which was statistically not significant . 24 hour and 2 week after the procedure too, mean IOP in group A and B shows statistically no significant difference. **CONCLUSION:** According to all data the study shows that there was some drop in IOP occurs in group A 2 days after capsulotomy suggestive of some effectivity of Timolol but it was not significant there was no any significant difference in mean IOP in both group in rest of the time interval after ND:YAG LASER capsulotomy , so it suggest that there is some role of prophylactic use of timolol 0.5% eyedrop for controlling IOP changes occurring within 3 day after ND:YAG laser capsulotomy. IOP changes are not significant may be due to small sample size , person to person diurnal variability in IOP, variable amount of laser energy and number of laser shots applied to remove posterior capsular opacification person to person.

**Keywords:** Intraocular pressure (IOP), ND:YAG LASER capsulotomy, Posterior Capsular Opacification (PCO), Timolol, Goldmann Applanation Tonometry ( GAT).ND:YAG ( neodymium-doped yttrium aluminium garnet) laser.

### INTRODUCTION

Cataract surgery currently the most common ophthalmic surgical procedure in the world. This procedure involves the extracapsular extraction of the opaque lens fibers and implantation of an intraocular lens (IOL) which restores good vision<sup>1</sup>. However , posterior capsular opacification (PCO), which is also termed as secondary cataract , is a common longterm complication modern cataract surgery<sup>2</sup>. The PCO may lead to either partial or complete obstruction of visual axis thus causing the problems of decreased vision ,

increase glare and interference in the day to day activities of the patient. So to restore back proper vision lost due to PCO, removal of the PCO is the only remedy. Of the various interventions available for treatment of PCO, ND: YAG laser capsulotomy is an established and safe procedure<sup>3</sup> for which photodisruptive property of ND:YAG laser (1064nm) using Q switched mode is utilized.ND:YAG laser clears the visual axis by creating a central opening in the opacified posterior capsule , but this procedure is not devoid of complications. Transient rise of intraocular pressure (IOP) is the most common complication following laser capsulotomy, which peaks in the first 3 hrs of laser application<sup>4</sup>. For preventing the transient rise of IOP there are varied opinions about the use of Timolol maleate eyedrops, which is nonselective  $\beta_1$  and  $\beta_2$  adrenergic receptor

### \*Corresponding Author:

Dr. Parth Leuva  
S.S.G. Hospital,  
And Medical college,  
Vadodara.  
Email : leuva.parth88@gmail.com  
Contact No: 9879251093

## Study of Intra Ocular Pressure changes after ND:Yag Laser Capsulotomy in Patients

antagonist and has an IOP lowering action by reducing aqueous humor production<sup>5</sup>. As IOP rise is the most common complication after capsulotomy and because of lack of common consensus about the efficacy and need of pre capsulotomy use of Timolol maleate (0.5%) eyedrop in controlling different ranges of raised IOP spikes, we were interested to carry out the study with aim to evaluate the role and efficacy of prophylactic use of Timolol maleate eyedrop in preventing rise of IOP post ND:YAG capsulotomy.

### MATERIALS AND METHODS

This was a prospective open labelled randomised comparative study conducted over a period of 5 months from March 2014 to July 2014 after getting approval by Institutional Ethics Committee. at Department of Ophthalmology, Sir Takhatsinhji Hospital and Government Medical College, Bhavnagar. This study was conducted in 50 eyes which were divided into 2 groups with 25 eyes in each group. Group A included eyes in which pre capsulotomy Timolol maleate (0.5%) was instilled and Group B included eyes which were undergone for capsulotomy without pre procedure use of Timolol maleate (0.5%)

eyedrop. Patients excluded were those already using antiglaucoma medications, patients in whom timolol is contraindicated, having absolute or relative contraindication to YAG capsulotomy (corneal oedema, corneal scarring, macular oedema). Precapsulotomy assessment of patients was done for vision, baseline IOP (applanation tonometry), fundus examination, slitlamp examination for any contraindication. Eyes in group A were undergone for capsulotomy with application of pre procedure topical timolol maleate (0.5%) eyedrop where as eyes from group B undergone for capsulotomy without prophylactic use of timolol maleate (0.5%) eyedrop. IOP was recorded immediately after, 1 hour after, 24 hour after, 48 hour after, 1 week after and 2 week after the procedure.

### RESULT AND ANALYSIS

In our study of 50 patients 30 were Male and 20 were female. In group A with pre procedure Timolol (0.5%) eyedrop 13 male and 12 female patients were treated. In group B without pre procedure Timolol (0.5%) eyedrop 17 male and 8 female patients were treated. Age of patients ranged from 35 to 90 years, Mean age was  $65 \pm 13.529$  in group A and  $59 \pm 12.014$  in group B.

**Table 1: MEAN IOP IN mmHg OF both group at each time interval**

	Pre procedure	After 1 hr	After 24 hrs	After 48 hrs	After 1 week	After 2 week
Group A with pre procedure topical timolol (0.5%)	12.88±2.011	11.56±1.69	13.08±3.06	12.36±3.36	13.28±2.24	14.16±2.27
Group B without pre procedure topical timolol (0.5%)	13.96±2.26	14.48±1.96	14.16±2.19	14.48±2.55	15.68±2.66	15.64±2.95

The Mean IOP in group A pre procedure was  $12.88 \pm 2.011$  mmHg,  $11.56 \pm 1.69$  mmHg after 1 hour,  $13.08 \pm 3.06$  mmHg after 24 hour,  $12.36 \pm 3.36$  mmHg after 48 hour,  $13.28 \pm 2.24$  mmHg after 1 week,  $14.16 \pm 2.27$  mmHg after 2 week respectively after ND:YAG laser capsulotomy. The Mean IOP in group B pre procedure was  $13.96 \pm 2.26$  mmHg,  $14.48 \pm 1.96$  mmHg after 1 hour,  $14.16 \pm 2.19$  mmHg after 24 hour,  $14.48 \pm 2.55$  mmHg after 48 hour,  $15.68 \pm 2.66$  mmHg after 1 week,  $15.64 \pm 2.95$  mmHg after 2 week respectively after ND:YAG laser capsulotomy.

**Table 2: Difference in IOP in mmHg from the baseline pre procedure IOP in both the group**

	After 1 hour	After 24 hour	After 48 hour	After 1 week	After 2 week
Differences in IOP from preprocedure IOP in group A with preprocedure topical timolol (0.5%) eyedrop	-1.32	+0.20	-0.52	+0.40	+1.38
Differences in IOP from preprocedure IOP in group B without pre procedure topical timolol(0.5%) eye drop	+0.52	+0.20	+0.52	+1.72	+1.68

This table shows increase or decrease in IOP compare to baseline mean IOP in both the group. In group A compare to baseline IOP, -1.32 mmHg reduction of IOP occur after 1 hour, +0.20 mmHg increase in IOP

occur after 24 hour, -0.52 mmHg reduction of IOP occur after 48 hour, +0.40 mmHg increase in IOP occur after 1 week, +1.38 mmHg increase in IOP occur after 2 week. In group B compare to baseline IOP, +0.52

## Study of Intra Ocular Pressure changes after ND:Yag Laser Capsulotomy in Patients

mmHg of IOP increase occur after 1 hour, +0.20 mmHg of IOP increase occur after 24 hour, +0.52 mmHg of IOP increase occur after 48 hour, +1.72 mmHg of IOP increase occur after 1 week, +1.68 mmHg of IOP increase occur after 2 week.

**Table 3 : Comparison of both group with UN PAIRED T test :**

Time Duration	P Value
1 Hour After	0.3276
24 Hour After	0.2946
48 Hour After	0.0774
1 Week After	0.3064
2 Week After	0.5539

This table shows that according to P value at different time interval after capsulotomy there was no statistically significant difference in IOP changes occur in both the group. According to all data the study shows that there was some drop in IOP occurs in group A 2 days after capsulotomy suggestive of some effectivity of Timolol but it was not significant, there was no any significant difference occur in mean IOP in both group in rest of the time interval after ND:YAG LASER capsulotomy, so it suggest that there is some role of prophylactic use of timolol 0.5% eyedrop for controlling IOP changes occurring within 3 day after ND:YAG laser capsulotomy. Intraocular pressure changes are not significant may be due to small sample size, person to person diurnal variability in intraocular pressure, variable amount of laser energy and number of laser shots applied to remove posterior capsular opacification person to person.

### DISCUSSION

ND:YAG laser posterior capsulotomy is the treatment of choice for the PCO. This procedure has gained popularity as it is non-invasive, relatively safer, less time consuming and free from infections as compared to needle capsulotomy but has been associated with complications like corneal burns, intraocular lens pitting and raised IOP varying from 1.6%<sup>6</sup> to 42.85%<sup>7</sup>. In the present study, the focus was kept on IOP changes following ND:YAG laser capsulotomy with and without pre-capsulotomy use of Timolol maleate 0.5% eye drops. It has been shown in the literature that Timolol maleate 0.5% is a useful intervention to inhibit IOP rise

following ND:YAG laser posterior capsulotomy<sup>6,8,9</sup>. In our study compared to baseline IOP, reduction in mean IOP occurs in group A and increase in mean IOP occurs in group B at different time interval but the difference in IOP changes is not significant statistically. Contrary to our study, Cai *et al.* (2008)<sup>10</sup> observed mean rise of 0.9 mmHg in the treatment group as compared to 2.1 mmHg in the placebo group and in another previous study by Rakofsky *et al.* (1997),<sup>8</sup> 7% of the Timolol group and 36% of the placebo group an IOP rise of >5mmHg was observed. Singhal D, Desai R *et al.*, did the study to see the effect of brimonidine on intraocular pressure following capsulotomy among Indian subjects. They found that 80% of the subjects showed a decrease in IOP after instilling 0.2% brimonidine (1 hour pre capsulotomy). No such decrease was observed in control. After 1 and 4 h post capsulotomy a statistically significant decrease in IOP ranging between 1-10 mmHg was found in 73.3% of the treatment group. In the present study 0.2% brimonidine has been proven effective to counteract the increase in IOP following ND:YAG laser capsulotomy in Indian setting<sup>11</sup>. In our study, there was some drop in IOP occurs in group A 2 days after capsulotomy suggestive of some effectivity of Timolol but it was not significant, there was no any significant difference occur in mean IOP in both group in rest of the time interval after ND:YAG LASER capsulotomy, so it suggest that there is some role of prophylactic use of timolol 0.5% eyedrop for controlling IOP changes occurring within 3 day after ND:YAG laser capsulotomy. IOP changes are not significant may be due to small sample size, person to person diurnal variability in IOP, variable amount of laser energy and number of laser shots applied to remove posterior capsular opacification person to person.

### CONCLUSION

According to all data the study shows that there was some drop in IOP occurs in group A 2 days after capsulotomy suggestive of some effectivity of Timolol

but it was not significant there was no any significant difference in mean IOP in both group in rest of the time interval after ND:YAG LASER capsulotomy , so it suggest that there is some role of prophylactic use of timolol 0.5% eyedrop for controlling IOP changes occuring within 3 day after ND:YAG laser capsulotomy. IOP changes are not significant may be due to small sample size , person to person diurnal variability in IOP, variable amount of laser energy and number of laser shots applied to remove posterior capsular opacification person to person.

**REFERENCES**

1. Beebe DC. The lens. In: Kaufman PL, Alm A, editors. *Adler's Physiology of the Eye: Clinical Application*. 10<sup>th</sup> ed. St Louis, MO: Mosby-Year Book; 2003. p. 117-58.
2. Spalton DJ. Posterior capsular opacification after cataract surgery. *Eye* 1999;13:489-92.
3. Stark WJ, Worthen D, Holladay JT, Murray G. Neodymium: YAG Lasers: An FDA Report. *Ophthalmology* 1985;92:209-12.
4. Bhattacharyya B. Nd: YAG Posterior Capsulotomy. *Clinical Applications: YAG Laser (Ophthalmology)*. 1<sup>st</sup> ed. Jaypee; New Delhi, India; 2005. p. 28-54.
5. Ge J, Wand M, Chiang R, Paranhos A, Shields MB. Long-term effect of Nd: YAG laser posterior capsulotomy on intraocular pressure. *Arch Ophthalmol* 2000;118:1334-7.
6. Hussain MM. Complications after Nd: YAG Laser Capsulotomy. *Pak J Ophthalmol* 1996;12:13-5.
7. Alimanovic-Halilovic E. [Complications in the posterior eye segment after Nd: YAG laser capsulotomy] *Med Arh* 2004;58: 7-9.
8. Rakofsky S, Koch DD, Faulkner JD, Terry SA, Mandell AI, Gross RL, *et al.* Levobunolol 0.5% and timolol maleate 0.5% to prevent intraocular pressure elevations after Nd-YAG laser posterior capsulotomy. *J Cataract Refract Surg* 1997;23:1075-80.
9. Allingham RR, Damji KG, Freedman SF, Moroi SE, Rhee DJ, Shields MB. Adrenergic receptor antagonist. In: *Shields's Textbook of glaucoma*. 6<sup>th</sup> ed. Lippincott Williams and Wilkins ; Philadelphia, USA; 2011. p 542-7.
10. Cai JP, Cheng JW, Wei RL, Ma XY, Jiang F, Zhu H, *et al.* Prophylactic use of timolol maleate to prevent intraocular pressure elevation after Nd-YAG laser posterior capsulotomy. *Int Ophthalmol* 2008;28:19-22.
11. Singhal D, Desai R *et al*, did the study to see the effect of brimonidine on intraocular pressure (IOP) following capsulotomy among Indian subjects. *J Pharmacol Pharmacother*.2011 APR;2(2):104-6.doi: 10.4103/0976-500X.81902