Original Article

A Comparative Study of Visual Outcome and IOP Changes in Postoperative PCO Cases Among Diabetics and Non Diabetics Following Nd: YAG Laser Capsulotomy

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Abstract

Background: Posterior capsular opacification is the most common long term complication of modern IOL surgery. ND: YAGlaserre mains the corner stone of its treatment. In this study, an attempt is made to study the visualout come and change in the intraocular pressure following Nd: YAG laser capsulotomy and compare the results between diabetic patients and non-diabetic patients.

Method: This was a prospective study of 100 patients (50 diabetics and 50 nondiabetics), conducted in Khaja Banda Nawaz Teaching and General Hospital, Kalaburgai. All patients in the age group 45-75 years, attending the regular OPD who presented with visually significant posterior capsular opacification and were treated with Nd:YAG laser capsulotomy. Patients were included in the study taking into consideration inclusion and exclusion criterias. Patients were followed up on first day, first week and the four weeks and the improvement in the BCVA and the changein IOP (Intra Ocular pressure) were recorded.

Results: All the patients treated for PCO with Nd:YAG laser capsulotomy showed an improvement in visual acuity. The visual outcome at four weeks (41%had $\geq$ 6/12) was found to be better than that at first week (34 % had the same) and first day (16% had the same). The final visualoutcome at 4 weeks was found to be better in non-diabetics (52% had$\geq$6/12) compared to diabetics (30% had$\geq$6/12). All the patients showed an increase in IOP at the first day and first week of follow up and return to near normal of baseline values at four weeks of follow up, the pattern of change in IOP being similar in both the study groups.

Conclusion: Nd:YAG laser capsule to May effectively improves the visualacuity inpatients with visually significant PCO. The comparatively poor outcome in the diabetic group can be attributed to the associated retinopathy changes. Nd:YAGl aser capsulotomy is associated with a transient rise in the intraocular pressure in all patients which can very rarely remain persistently high.

Keywords: ND: YAG, Best corrected visual acuity (BCVA), Posterior capsular opacification (PCO), intraocular pressure(IOP)

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Introduction

Posterior capsule opacification is the most common long tern post-operative complication following un-complicated cataract surgery[1]. It usually causes a decrease in the visual acuity by directly blocking the visual axis. It can also cause indirect complications secondary to mechanical forces.

Diabetics are at increased risk of developing PCO[2] but the rate of progression may be slower in the diabetes compared to non-diabetics[3].

Various methods have been employed for the prevention of PCO like capsular polishing implantation of intra ocular lens with concave posterior surface, the surface modified lenses, and usage of anti-mitotic but none of these have shown to be successful on long term follow up. Hence attempt was made to compare the outcome of Nd: YAG laser posterior capsulotomy in diabetes and non-diabetes developed PCO post-operatively in terms of the best corrected visual acuity (BCVA) and intra ocular pressure (IOP) in both groups.

Material and Method

100 (one hundred) patients aged between 45-75years regularly visited to Ophthalmology department of KBN teaching and general hospital Kalaburgi-585102.

Inclusive Criteria: The patients diagnosed PCO Aged between 45-75 years planned for Nd:YAG capsulotomy. Consent taken from participants.

Exclusion Criteria: All hypertensive patients, Patients with type 1 DM. Patients with anterior segment pathology like corneal scar, corneal irregularity, corneal edema, keratitis, conjunctivitis, Patients with glaucoma, Patients with suspected cystoid macular edema.

Method: Out of 50 patients were type-II DM and 50 were non-diabetics. Detailed history was taken in prescribed proforma. Visual acuity was checked by using snellen's visual acuity chart.

Pupils were dilated using tropicamide 0.5% and phenylephrine 5% drops. Slit lamp examination was done to assess anterior segment with special attention to type and grade of PCO. Further Fundus examination was done. IOP was measured using Goldmann Applantion Tonometre.

Assessment of PCO: Pupils were dilated and slit lamp bio microscopy using retro illumination was performed giving special attention of posterior capsule under IOL optic. PCO grading was done by kuck Sumer etal[5] by subjective assessment of the extent and density (assessed by its adverse effect on BCVA) of the lensepithelial cells migration on the posterior capsule.

Nd: YAG capsulotomy was done by using topical anaesthesia, 1.2 drops of proparacaine 0.5%, patients were made to Sit comfortably at APPA SAMY Nd: YAG laser machine and an illuminated target were provided to the patient for maintaining steady fixation. Abraham lens (contact lens) was placed to stabilize the eye and to improve the laser optics and facilitate accurate focussing. Once the procedure was completed, the patient was advised regarding the scheduled follow up day 1, 1st week and 4th week after the procedure. During each follow up BCVA and IOP were recorded.

Duration of study was March-2021 to August-2022.

Statistical analysis: Grades of PCO were classified with percentage. The follow up at various interval in both groups were compared with t test and significant results were noted. The statistical analysis was carried out in SPSS software. The ratio of male and female was 1:1.

Observation and Results

Table-1: Distribution of patients according to grade and type of PCO

Fibrous – 28 (56%) in group-A (diabetics), 33 (66%) in group-B (Non-diabetics)

Pearl – 22 (44%) in group-A, 17 (34%) in group-B

Table-2: Comparison of pattern of change in Intra-ocular pressure during follow-up

Pre Op ND: YAG in group-A 14.4 (± 2.59), 20.2 (±2.25) in follow-up, 9.4 (± 2.46) First week, 15.18 (± 2.11) up to 4 week.

Pre OP V/s don I, t test 19.2 and p<0.001

Day 1 v/s 1 week, t test 2.37 and p<0.001

1 week v/s 4 week, t test 15.8 and p<0.001

In group-B

Pre-OP ND: YAG – 14.4 (± 2.52), 20.86 (±2.90) Day

Pre-OP v/s Day-1 t test 15.5 and p<0.001

20.86 (±2.90) Day-1, 19.56 (±4.10) 1 week

Day 1 v/s 1 week, t test 2.12 and p<0.03 and

19.56 (±4.16) Follow-up 1st week, 15.32 (±3.47) Follow-up 4th week

1 week v/s 4th weeks t test 11.3 and p<0.001

Table 1: Distribution of patients according to grade and type of PCO

Type of PCO	Group-A (Diabetic)		Group-B (Non-Diabetic)		Total	
	No	%	No	%	No	%
Fibrous	28	56.0	33	66.0	61	61.9
Pearl	22	44.0	17	34.0	39	39.0
Total	50	100.0	50	100.0	110	100.0
X^2 Test value p-value	X^2 = 1.054, p= 0.719, NS					

Table 2: Comparison of pattern of change in IDP during following-up within the group

Groups	Pre-op ND: YAG	Follow-up Day 1	Follow-up 1 week	Follow-up 4 week
IOP	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Group-A (Diabetics)	14.46 (±2.59)	20.20 (±2.35)	19.40 (±2.46)	15.18 (±2.35)
Comparison	--	Pre-op v/s day 1	Day 1 v/s 1 week	1 week v/s 4 week
Group- (Non-Diabetics)	14.40 (±2.52)	20.86 (±2.90)	19.56 (±4.16)	15.32 (±3.47)
Comparison	--	Pre-op v/s day 1	Day 1 v/s 1 week	1 week v/s 4 week
Paired t test	--	t=15.52 p=0.001	t=2.124 P=0.033, S01	t=11.36 p=0.000, HS

NS= not significant, S=significant, HS = highly significant

Discussion

Present comparative study of visual outcome and IOP changes in post-operative PCO cases among diabetics and non-diabetics in north Karnataka population. The grades of types of PCO study included 28 (56%) fibrous in group-A (diabetics) and 33 (66%) in Non-diabetics, 22 (44%) pearl shaped PCO in group-A, 17 (34%) in group-B (non-diabetics) Total 61% fibrous 39% pearl shaped PCO were noted (Table-1). In the comparison of follow-up In group0A (diabetics) pre-operative 14.446 (± 2.59) v/s 20.20 (± 2.25) on first day follow up t test value 19.2 and p<0.001, 20.2 (±2.25) Follow up 1day versus follow up 1st week, 19.40 (±2.46) t test 2.37 and p<0.01 (significant), 19.40 (±2.40) Follow-up 1st week v/s 15.13(±2.15) follow-up 4th week, t test was 15.8 and p<0.001 (highly significant). In group-B pre-operative 14.4 (±2.52) versus, 20.86 (±2.90) First day follow-up t test 15.5 and p<0.001, 20.86 (±2.90) 1st day follow-up v/s 19.56 (±4.16) 1st week follow-up t test 2.12 and p<0.03 (highly significant), 19.56 (±4.16) 1st week follow-up v/s 15.32 (±3.47) t test was 11.3 and p<0.001 (highly significant) (Table-2). These findings are more or less in agreement with previous studies [6][7][8].

The pulsed Nd: YAG laser has revolutionised approach to PCO membranes Laser capsulotomy has a few advantage in comparison to surgical decision as it is a non-invasive method, an OPD procedure that takes just few minutes causes no discomfort to the patient and also has an added benefit of eliminating endophthalmitis as a potential complication. Elevated Intra ocular pressure (IOP) is the most common phenomenon but transient complication following Nd: YAG laser capsulotomy[9].

Few elderly patients underwent Nd: YAG laser capsulectomy did not show satisfactory results it was due to age related macular degeneration cystoids macular oedema ischemic optic neuropathy and amblyopia which were un-identified before the operation[10].

In the present comparative study 24% of type-II DM patients had visual acuity ≥ 6/12 and 20% in non-diabetic patients in 1st day follow-up 26% of type-II DM had visual acuity ≥ 6/12. Hence it clearly confirms that poor visual acuity is due to diabetic retinopathy[11].

Summary and Conclusion

Present comparative study of visual out come and intra ocular pressure (IOP) in post-operative PCO cases among diabetic and non-diabetic patients. In diabetic patients satisfactory visual acuity was not observed due to diabetic retinopathy changes. Moreover few old aged patients had also poor outcome of visual acuity due to age related degenerative diseases. However the present Nd: YAG laser capsulotomy has better results as compare to other older techniques.

Limitation of Study: Owing to tertiary location of research centre, small number of patients, lack of latest techniques, we have limited findings and results.

This research paper was approved by Ethical committee of Faculty of Medical sciences Khaja Banda Nawaz University Kalaburgi, (Karnataka)

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