

Comparative Study of Visual Outcome and IOP Changes in Postoperative PCO Cases among Diabetics and Non-diabetics in Santhal Pargana Jharkhand Population

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Abstract

Background: Posterior capsular opacification was treated with the Nd: YAG laser technique. It is accepted globally because of its short duration and non-invasive technique, but among diabetes patients, this technique is not satisfactory; hence, it is a challenge for ophthalmic surgeons to treat PCO patients who are diabetic.

Method: Out of 90 patients having PCO, 45 were type-II DM and 45 were non-diabetics (aged between 45 to 75 years). Pupils were dilated using tropicamide 0.5% and phenylephrine 5% drops for slit lamp examination to assess the anterior segment and to study grades of PCO. Abraham's lens was placed with the help of an APPA SAMY Nd: YAG laser machine, and follow-up was on day 1, the 1st week, and the 4th week, and BCVA and IOP were recorded on every follow-up.

Results: 61% fibrous and 38.8% pearl types of PCO were noted. In the comparison of follow-up in both group A (type-II DM) and type I (non-diabetic), there was a significant p-value ($p < 0.001$).

Conclusion: It is proved that Nd: YAG laser capsulotomy effectively improves visual acuity, but a poor result was observed in type-II DM patients due to diabetic retinopathy.

Keywords: ND, YAG, BCVA, PCO, IO.

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Introduction

Posterior capsular opacification is the most long-term complication of modern IOL surgery. It occurs frequently in patients after cataract surgery, especially senile cataracts [1].

Many methods have been employed to reduce the incidence of PCO, but none of these appears to be very effective [2].

Initially PCO used to be removed surgically, but now the Nd:YAG laser is most commonly used as the best mode of treatment.

Nd: YAG capsulotomy is the ideal treatment for PCO because it is a non-invasive, short-duration, and safe technique to manage an intact posterior capsule that opacifies postoperatively [3].

Diabetic mellitus patients are at most risk of developing PCO because it attacks the cardiovascular system, central nervous system, and peripheral nervous system, causing irreparable degenerative changes; hence, an attempt is made to compare the PCO study in both diabetic and non-

diabetic patients [4]. The pros and cons of both groups of patients were evaluated.

Material and Method

90 (ninety) patients aged between 45 and 75 years regularly visited the ophthalmology department of Sadar hospital Dumka cum upgraded phulo Jhano Medical College hospital, Dumka, Jharkhand-814101 were studied.

Inclusive Criteria: The patients diagnosed with PCO, aged between 45 and 75 years, fit for ocular surgery and gave their consent in writing were selected for the study.

Exclusion Criteria: Patients, who had already undergone PCO surgery, were allergic to tropicamide or phenylephrine drugs, had cardiovascular diseases, or were on anti-depression treatment, and immune-compromised patients were excluded from the study.

Method: Out of 90 patients, 45 had type-II DM and 45 were non-diabetics. A detailed history was

taken in the 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 the anterior segment with special attention to the type and grade of PCO. Further fundus examination was done. IOP was measured using a Goldmann applanation tonometer.

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

Nd:YAG capsulotomy was done by using topical anesthesia; 1.2 drops of proparacaine 0.5% were used, and patients were made to sit comfortably at APPA. SAMY A Nd:YAG laser machine and an illuminated target were provided to the patient for maintaining steady fixation.

An Abraham lens (contact lens) was placed to stabilize the eye and to improve the laser optics and facilitate accurate focusing. Once the procedure was completed, the patient was advised regarding the scheduled follow-up day 1, the 1st week, and the 4th week after the procedure. During each follow-up, BCVA and IOP were recorded.

The duration of the study was February 2024 to December 2024.

Statistical Analysis: Grades of PCO were classified with percentage. The follow-ups at various intervals in both groups were compared with a 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 types of PCO

- Fibrous: 25 (55.5%) in diabetics, 30 (66.6%) in non-diabetics, total 55 (61%).
- Pearl: 20 (44%) in diabetics, 15 (33.3%) in non-diabetics, 35 (38.8%) is total number of studied; $X^2 = 1.052$ and p-value is insignificant.

Table 2: Comparison of pattern of change in IOP during following up in both groups

- Group A (Diabetics): 14.22 (± 2.36) in preoperative ND: YAG, 20.22 (± 2.60) in follow-up Day 1, 20.90 (± 3.32) Follow up 1 week, 16.12 (± 2.8), t-test 11.8 and $p < 0.001$. Pre-op 1 day v/s 1 week t test was 3.36 and $p < 0.001$. 1 week v/s 4 weeks was compared t test 10.8 and $p < 0.001$
- Group-B (non-diabetics): 14.88 (± 2.28) pre-op ND: UAG, 21.40 (± 2.78) Follow up Day 1, 20.18 (± 3.15) Follow up 4 week, pre-op V/s day 1 had t test 11.7 and $p < 0.001$ (p value was highly significant) Day 1 V/S 1 week had t test value is 9.1 and $p < 0.001$ (p value was highly significant) 1 week V/S 4 week had t test value was 7.5 and $p < 0.001$ (p value was highly significant).

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

Type of PCO	Group-A (Diabetic)		Group-B (Non-Diabetic)		Total	
	Number	%	Number	%	Number	%
Fibrous	25	55.5	30	66.6	55	61
Pearl	20	44.4	15	33.3	35	38.8
Total	45	100	45	100	90	100

X^2 Test: $X^2 = 1.052$, p value: insignificant

Discussion

Present a comparative study of visual outcome and IOP changes in post-operative PCO cases among diabetics and non-diabetics. The grades of types of PCO study included 25 (55.5%) fibrous in group A (diabetics) and 30 (66.6%) in non-diabetics, 20 (44.4%) pearl-shaped PCO in group A, and 15 (33.3%) in group B (non-diabetics). A total of 61% fibrous and 38.8% pearl-shaped PCO were noted (Table 1). In comparison of follow-up in group A (diabetic). Pre-operative 14.22 (± 2.36) versus 20.22 (± 2.50) on follow-up on the first day; the t-test value was 11.8 and $p < 0.001$. In follow-up, 20.22 (± 2.50) on the first day versus 21.90 (± 3.23) in the first

week, the t-test was 3.36 and $p < 0.001$ (highly significant). In the first week, 21.90 (± 3.22) versus the fourth week, 16.12 (± 2.80); the t-test was 10.8 and $p < 0.001$ (the p-value is highly significant).

In the group B, also pre-op ND: YAG 14.88 (± 2.28) versus 1st day follow-up 21.40 (± 2.78), the t-test was 12.1 and $p < 0.001$ (p-value is highly significant). 1st day: 21.40 (± 2.78) versus first week: 20.18 (± 3.15). The t-test was 2.72 and $p < 0.001$ (the p-value was highly significant). 1st week: 20.18 (± 3.15) versus fourth week: 15.3 (± 3.20); t-test: 10.8 and $p < 0.001$ (p-value is highly significant) (Table 2). These findings are more or less in agreement with previous studies [6,7,8].

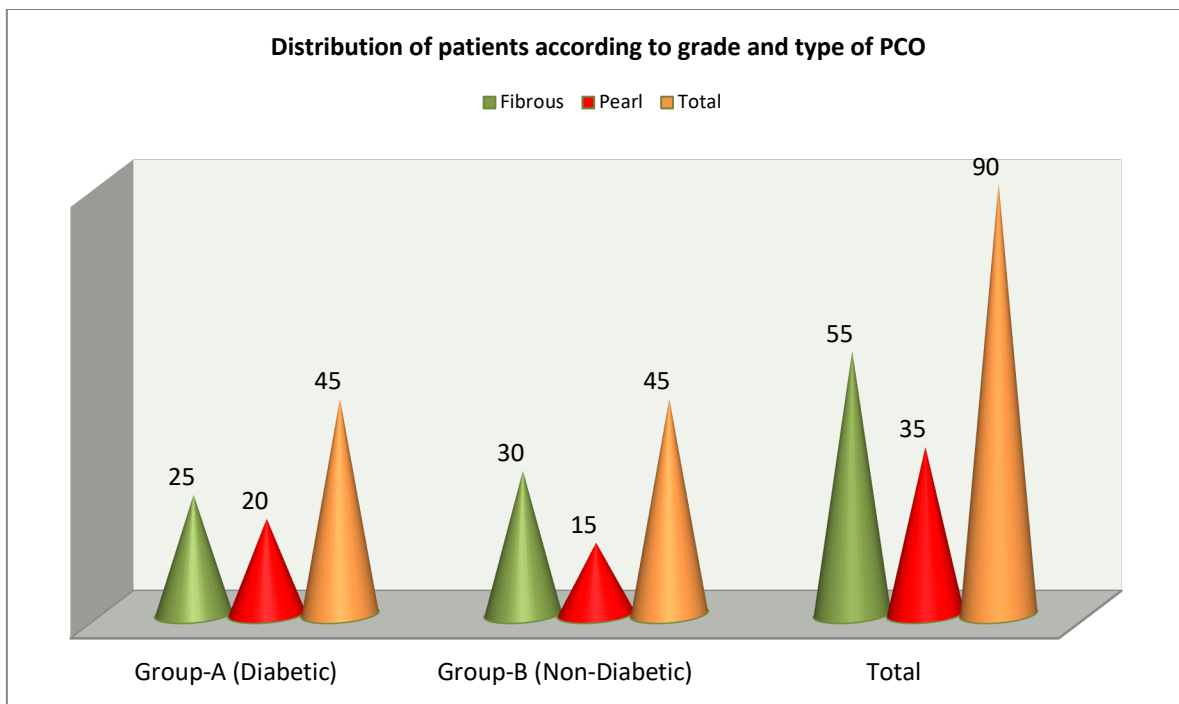


Figure 1: Distribution of patients according to grade and type of PCO

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)	14.22 (±2.36)	20.22 (± 2.50)	21.40 (± 2.23)	16.14 (± 2.30)
Comparison	--	Pre-op v/s day 1 t test 11.8 p<0.001	Day 1 v/s 1 week t test 3.36 p<0.001	1 week v/s 4 week t test 10.8 p<0.001
Group-B (Non-Diabetics)	14.88 (± 2.28)	21.40 (± 2.78)	20.18 (± 3.15)	15.3 (± 2.80)
Comparison	--	Pre-op v/s day 1	Day 1 v/s 1 week	1 week v/s 4 week
Paired t test	--	t=12.1 p<0.001	t=2.72 p<0.001	t=10.8 p<0.001

P value is highly significant

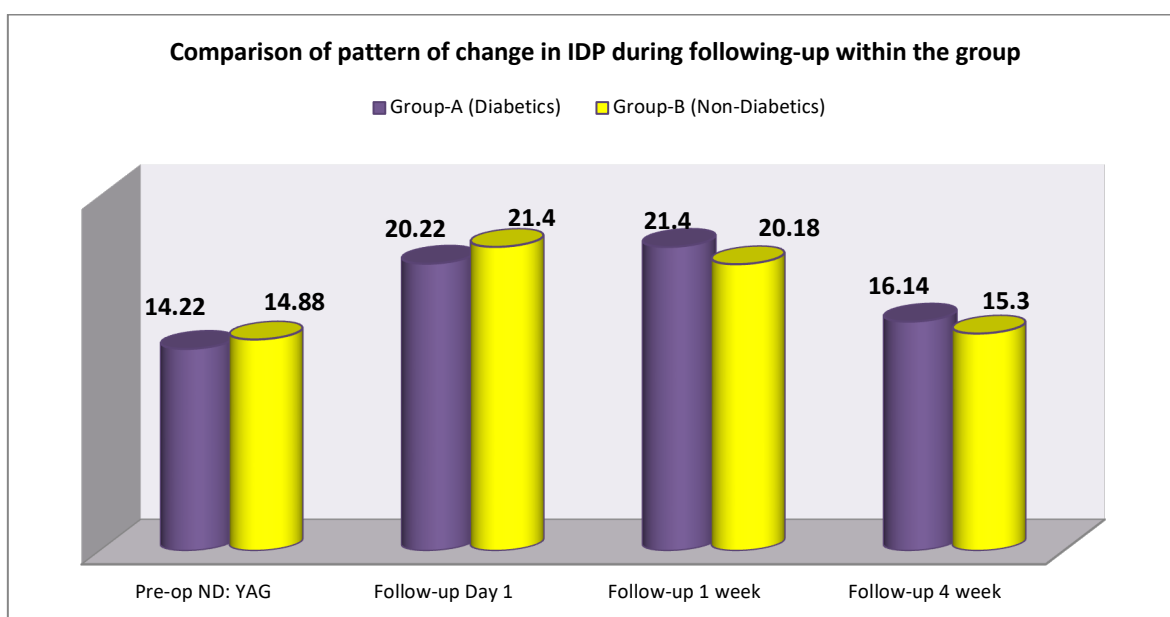


Figure 2: Comparison of pattern of change in IDP during following-up within the group

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

Few elderly patients who underwent Nd: YAG laser capsulotomy did not show satisfactory results; it was due to age-related macular degeneration, cystoid macular edema, ischemic optic neuropathy, and amblyopia, which were unidentified before the operation [10].

In the present comparative study, 24% of type-II DM patients had visual acuity $\geq 6/12$, and 20% of non-diabetic patients had visual acuity $\geq 6/12$ on the 1st day follow-up 26% of type-II DM patients had visual acuity $\geq 6/12$. Hence, it clearly confirms that poor visual acuity is due to diabetic retinopathy because in diabetic patients hyperglycemia causes highly viscosity in blood flow hence there is improper or reduced blood flow to peripheral organs including retina [11]. Moreover, central artery of rectino is an end artery minute lesion may lead to diabetic retinopathy.

Summary and Conclusion

Present a comparative study of visual outcome and intraocular 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 also had poor outcomes of visual acuity due to age-related degenerative diseases. However, the present Nd: YAG laser capsulotomy has better results compared to other older techniques. Early approach to medical aid may reduce the postoperative complications.

Limitation of study: Owing to remote location of research centre, small number of patients and lack of latest techniques, we have limited finding and results.

This research work was approved by the ethical committee of Sadar hospital Dumka and upgraded phulo Jhano Medical College hospital, Dumka, Jharkhand-814101.

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