Section: Ophthalmology

Original Research Article

A COMPARATIVE STUDY OF VISUAL OUTCOME AND IOP CHANGES IN POSTOPERATIVE PCO CASES AMONG DIABETICS AND NON-DIABETICS – RETROSPECTIVE STUDY

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Abstract

Background: There is a close relation between type-II DM patients and intra-ocular pressure because DM affects very vital organs of the body. The pathogenesis behind type-II DM and intraocular pressure (IOP) has to be ruled out. **Materials and Methods:** Out of 200patients having PCO, 100 were type-II DM and 100 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 before the procedure and on every follow-up. **Result:** 61% fibrous and 39% 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 confirmed that Nd:YAG laser capsulotomy effectively improves visual acuity, but a poor result was observed in type-II DM patients due to diabetic retinopathy.

INTRODUCTION

Intraocular pressure (IOP) is determined by the balance between the production of aqueous humour and its drainage, various factors may influence the level of intraocular pressure (IOP) Eg. age, sex, blood pressure, body mass Index diabetes mellitus (type-II DM).[1] Elevated IOP is a significant risk factor for the development of primary open angle glaucoma (POAG). Glaucomais the leading cause of blindness globally.[2]

Diabetes mellitus is associated with long term damage to various organs such as eye, kidney, heart, blood vessels and nerves. Diabetes mellitus is emerged as a major cause of vision loss and visuals disability worldwide.[3] Besides its other ocular manifestations diabetes also affects intraocular pressure. The association of diabetes with elevated IOP and primary open angle glaucoma is controversial.[4] The mechanism that causes higher IOP is not clear but various etiologies have been postulated as genetic, autonomic dysfunction and osmotic diffusion. Hence an attempt is made to evaluate the correlation of type-II DM and IOP by comparing with non-diabetic healthy adults.

MATERIALS AND METHODS

200 (two hundred) patients aged between 45 and 75 years regularly visited the ophthalmology department of Yadgiri Institute of Medical Sciences, Yadgiri-585202, Karnataka were study.

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 200 patients, 100 had type-II DM and 100 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 Goldmannapplanation tonometer.

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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:YAGcapsulotomy was done by using topical anesthesia; 1.2 drops of proparacaine 0.5% were used, and patients were made to sit comfortably at APPASAMY 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 September 2022 to February 2023.

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.

RESULTS

[Table 1] Distribution of patients according to grade and type of PCO

- Fibrous: 56 (56%) in diabetics, 66 (66%) in non-diabetics, total 122 (61%).
- Pearl: 44 (44%) in diabetics, 34 (34%) in non-diabetics, total 78 (39%); X^2 test: 1.054 and p-value is insignificant.

[Table 2] Comparison of pattern of change in intra-ocular pressure during follow-up Pre-ND: YAG group—A 15.43 (± 2.32), 20.28 (± 2.60) in follow-up, 21.40 (± 2.23) in the first week, 16.14 up to 4 weeks. Pre-OP vs. Day 1: t-test 13.9 and p<0.001. Day 1 v/s First Week: t-test 3.26 and p<0.001,1st week v/s 4th week t test 16.4, p<0.001.In group B (non-diabetic), pre-op ND: YAG 15.20 (± 2.25) and 21.45 (± 2.80) on Day 1; pre-op v/s Day-1 t-test 17.4 and p < 0.001; Day 1 v/s 1st week test 7.4 and p < 0.001. Day 1 v/s 1st week, the t-test was 3.39 and p<0.001; 1st week v/s fourth week, the t-test was 13.2 and p<0.001. In both group A and group B, the p-value is highly significant.

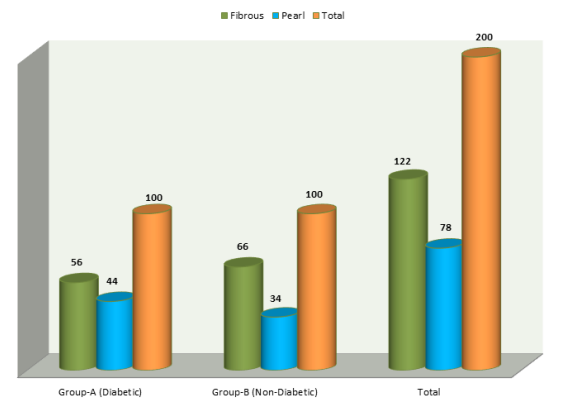

Figure 1: Distribution of patients according to grade and type of PCO

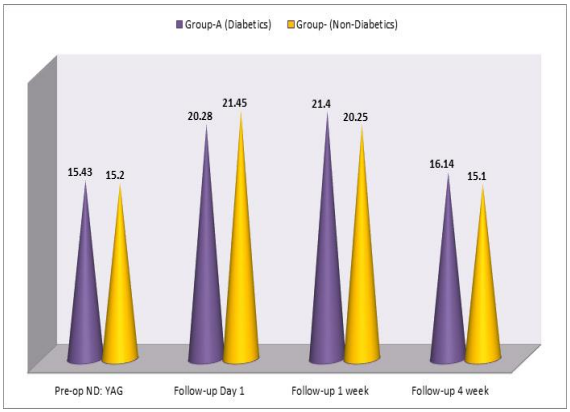

Figure 2: Comparison of pattern of change in IOP during following-up within the group

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	56	56	66	66	122	61
Pearl	44	44	34	34	78	39
Total	100	100	100	100	200	100

X2 Test: X2 = 1.054

p value: Not significant

Table 2: Comparison of pattern of change in IOP 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)	15.43 (±2.32)	20.28 (± 2.60)	21.40 (± 2.23)	16.14 (± 2.30)
Comparison	--	Pre-op v/s day 1	Day 1 v/s 1 week	1 week v/s 4 week
Group- (Non-Diabetics)	15.20 (± 2.23)	21.45 (± 2.80)	20.25 (± 2.15)	15.1 (± 3.20)
Comparison	--	Pre-op v/s day 1	Day 1 v/s 1 week	1 week v/s 4 week
Paired t test	--	t=30.10 p<0.001	t=4.2 p<0.001	t=22.6 p<0.001

P value is highly significant

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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 56 (56%) fibrous in group A (diabetics) and 66 (66%) in non-diabetics, 44 (44%) pearl-shaped PCO in group A, and 34 (34%) in group B (non-diabetics). A total of 61% fibrous and 39% pearl-shaped PCO were noted [Table 1]. In comparison of follow-up in group A (diabetic). Pre-operative 15.43 (±2.32) versus 20.28 (±±2.60) on follow-up on the first day; the t-test value was 13.9 and $p < p<0.001$. In follow-up, 20.28 (± 2.60) on the first day versus 21.40 (± 2.23) in the first week, the t-test was 3.26 and $p<0.001$ (highly significant). In the first week, 21.40 (± 2.23) versus the fourth week, 16.14 (± 2.30); the t-test was 13.2 and $p < p<0.001$ (the p-value is highly significant). In the group B, also pre-op ND: YAG 15.20 (± 2.23) versus 1st day follow-up 21.45 (± 2.80), the t-test was 17.4 and $p < p<0.001$ (p-value is highly significant). 1st day: 21.45 (± 2.80) versus first week: 20.25 (± 2.15). The t-test was 3.39, and $p < 0.001$ (the p-value was highly significant). 1st week: 20.25 (± 2.15) versus fourth week: 15.15 (± 3.20); t-test: 13.2 and $p < p<0.001$ (p-value is highly significant) [Table 2]. These findings are more or less in agreement with previous studies.[6-8]

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 capsulectomy 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 ≥ 6/12, and 20% of non-diabetic patients had visual acuity ≥ 6/12 on the 1st day follow-up 26% of type-II DM patients had visual acuity ≥ 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 retina is an end artery minute lesion may lead to diabetic retinopathy.

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.

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