

Are Diabetic Patients More Liable to Intraocular Pressure Elevation after YAG Laser Posterior Capsulotomy than Non-diabetics?

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ABSTRACT

Background: Opacified posterior capsule of the human lens (PCO) is a common vision-blurring complication after cataract surgery. YAG laser capsulotomy is an effective, relatively safe procedure to treat PCO, effectively improves the visual acuity (VA) and contrast sensitivity. Increase intraocular pressure (IOP) following YAG laser is the mainly transient complication after the procedure.

Aim of the study: to compare IOP elevation in diabetic versus non-diabetic patients following YAG laser of the posterior capsule to treat posterior capsular opacification.

Patients and methods: This is non-randomized prospective comparative interventional study. The study was conducted on 60 eyes of 44 patients (26 males, and 18 females) who were attended to Ophthalmology department at Al-Zahraa University Hospital, with posterior capsular opacification after cataract surgery. Patients were divided into two equal groups: **Group A diabetic:** 30 eyes in 19 patients, and **Group B non diabetic:** 30 eyes in 25 patients. Surgeries was carried under surface anaesthesia, in a cruciate manner technique, least number of shots and least energy power to form an opening of the posterior capsule equal in diameter to the scotopic pupil size. Follow up was done after two hours, one day, one week, and one month after laser treatment. At each visit the patient was examined and measurement of uncorrected distance visual acuity and (UDCVA), best distance corrected visual acuity (BDCVA), anterior segment examination by using slit lamp for anterior chamber evaluation (depth and content), IOL for any injuries and decentered, applanation tonometry and indirect ophthalmoscopy, notation for any complications.

Results: In Group A, mean baseline IOP before Nd-YAG laser posterior capsulotomy was 13.45 mmHg. At two hours, one day, one week and one month following the operation, IOP was 15.47, 14.06, 13.81 and 13.64 mmHg respectively. No IOP elevation above the pre-laser level at the end of follow up visits at one month. In Group B: mean baseline IOP was 14.19 mmHg. At two hours, one day, one week and one month after capsulotomy, IOP was 16.01, 14.88, 14.92 and 13.92 mmHg respectively. No IOP elevation more than 5 mmHg was observed at the end of follow up visits. The rise in IOP was transient. The difference between mean pre-laser IOP and two hours after laser capsulotomy was statistical highly significant and was significant one day after the operation. Differences were insignificant after one week and one month. Differences between both groups were non-significant at all follow up visits. There were no persistent elevation of IOP after one month follow up period, and IOP returned to the pre-laser level in both groups. No glaucomatous fundus changes were observed in any of our cases.

Conclusion: Nd-YAG is an effective a quick, painless laser procedure treatment modality for posterior capsular opacification. IOP elevation is a frequent complication after YAG laser capsulotomy, which may be directly proportional to laser energy power, the number of shots, and the cumulative energy. The maximum elevation of IOP is two hours after the procedure and is usually becomes normalized within seven days after the operation.

Keywords: Nd-YAG laser, Posterior capsulotomy, Complications, Intraocular pressure.

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Introduction

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After cataract surgery, opacification of the posterior capsule (PCO) might occur. Which can occur often slow over months or years (Saad et al., 2023). Globally, the incidence of PCO rates change over time; sources show significant increases from 1 year (around 4% to 5 years (over 30%) (Prempal et al., 2018). Key risk factors influencing PCO include: patient's age, IOL type, surgical technique through cleaning, and underlying ocular systemic diseases as diabetes and active uveitis (Cevher et al., 2017).

Blurry haze vision, as a result of PCO, the most common visual problems include diplopia, glare, and poor contrast sensitivity (Paul et al., 2018). It happens when leftover lens cells proliferate and migrate which can spread across the posterior capsule causing it to thicken and become opaque (Javier et al., 2020). Laser capsulotomy is a simple, outpatient procedure using a special YAG laser, which creates a tiny, clear hole in the center of the capsule. (Loana et al., 2017). The procedure is effective, easy, relatively safe and with less time consuming (Najam et al., 2016). It effectively improves the quality and quantity of vision, contrast sensitivity, glare, decreases light scattering of the eye and improves patient satisfaction (Jun et al., 2020).

YAG capsulotomy is safe, but still complications can include common, increase floaters, glare, and transient increase IOP spikes, plus rarer, more serious problems like retinal tears/detachment, cystoid macular edema (CME), and uveitis (inflammation), endophthalmitis and damage to (IOL) or cornea. (Takeshi et al., 2020). The rise in intraocular pressure (IOP) after Nd:YAG laser treatment include the deposition of debris (lens /capsule bits) blocking the trabecular meshwork, inflammatory process causing trabeculitis, iris and ciliary body swelling as a consequence of the radiating "shock waves", neurovascular mechanisms, mechanical disruption leading to pupillary block (Parajuli et al., 2019). The higher Laser Energy/Shots: Higher total energy and more laser pulses increase the chance and severity of IOP spikes which contrasted with those that reduced energy use (Uzma et al., 2020).

AIM OF THE STUDY

The aim of this study is to compare between IOP elevation in diabetic versus non-diabetic patients after Nd-YAG laser posterior capsulotomy for treatment of opacified posterior capsule.

Patients and Methods

This study is non randomized prospective comparative interventional study. It was lasted about two years at the Ophthalmology Department of Al Zahraa University hospital from (July, 2020 until December, 2024). The study was conducted on 60 eyes of 44 patients (26 males, 59.1 % and 18 females, 40.9%) with substantial posterior capsular opacification after cataract surgery. Their mean age \pm SD was 62.2 ± 7.6 years (Range: 50 – 76 years).

Patients were divided into two equal groups:

Group A: Included 30 eyes in 19 diabetic patients (12 males, 63.2 % and 7 females, 36.8%). Their mean age \pm SD was 60.9 ± 6.8 years (Range: 50 74 years).

Group B: Included 30 eyes in 25 non-diabetic patients (14 males, 56.0 % and 11 females, 44.0%). Their mean age \pm SD was 63.6 ± 7.7 years (Range: 52 – 76 years).

Ethical consideration:

The study was approved by the Ethics Board of 6th of October University. The study protocol was in accordance with the tenets of declaration of Helsinki. All procedures were done at Al-Zahraa University Hospital. This study is not financially supported from any organization, society or government. An informed written consent was obtained from all participants

Inclusion criteria:

- Age more than 18 years.
- Opacified posterior capsule in pseudophakic eyes after phacoemulsification surgery.
- Density of posterior capsular opacification was significantly impairing visual acuity.
- Cooperative patient.
- Both sexes.
- Date of cataract surgery is at least 6 months prior Nd-YAG laser posterior capsulotomy.
- Clear cornea.
- Pre-laser intraocular pressure (baseline Intraocular Pressure) is between 10 and 20 mmHg.

Exclusion criteria:

- Pathology of anterior segment as conjunctivitis, keratitis, central corneal scarring , corneal dystrophy or anterior uveitis.
- Elevated IOP ,or presence of Glaucoma.
- Posterior segment pathology as cystoid macular oedema, retinal tears or retinal detachment.
- Patients operated for traumatic cataract.

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- Cataract surgery was performed was performed by other technique than phaco surgery.
- Date of cataract surgery of less than 6 months.
- Complicated phaco surgery.
- Aphakic eyes.

Preoperative evaluation:

Patients were evaluated preoperatively by history taking and examination.

History:

Including demographic data: name, age, sex address, telephone number marital status and occupation. Past history of ocular inflammation or infection , data related to inclusion and exclusion criteria and past history of ocular diseases or trauma. Type and date of cataract surgery was reported. Type and duration of Diabetes Mellitus in group A were reported.

A comprehensive ophthalmic examination ,including:

- Best corrected and uncorrected distant Visual acuity (BCDVA)(UCDVA): was measured using a Landolt' broken ring chart then converted to Log Mar scoring for statically purposes.
- Slit-lamp examination using (NIDEK S.A FRANCE)forevaluation of (cornea- lens- anterior chamber).
- Intra ocular pressure recording using the Goldmann's Applanation Tonometry (KEELER, UK).
- Gonioscopy :using the goldmann 3 –mirrors contact goniolens .(Volk OPTICAL ,USA) for angle assessment.

Type of posterior capsular opacification

- Fibrotic type (thickening /wrinkling of the capsule)
- Pearl (Elschnig's pearls) cluster of cells)
- Mixing type resulting from leftover lens epithelial cells (LECs) .

Degree of density of posterior capsular opacification was identified as follows:

- **Mild:** (Clear fundus examination by the indirect ophthalmoscopy).
- **Moderate:** (Fundus details could be examined with difficulty by the indirect ophthalmoscopy).
- **Severe:** (Fundus details were not seen by the indirect ophthalmoscopy).

Mild cases with posterior capsule opacification were excluded from the study.

- Applanation tonometry
- Fundus examination using the slit-lamp biomicroscopy and the 90D lens.

Technique of Nd-YAG laser posterior capsulotomy:

The laser machine used in this study was NIDEK YC – 180 Ophthalmic YAG Laser System. It is provided with He-Ne aiming laser for accurate focusing of the invisible Nd-YAG laser beam.



Figure (1): NIDEK YC – 180 Ophthalmic YAG Laser machine



Figure (2): The control Panel of the NIDEK YC – 180 Ophthalmic YAG Laser machine.

Eyes in both groups were prepared by pupillary dilatation using 1% tropicamide eye drops. It was applied 3 times with 15 minutes intervals one hour before the procedure of Nd-YAG laser posterior capsulotomy.

Procedure

A YAG laser capsulotomy procedure involves using a painless laser to create a small opening in the posterior capsule allowing light to pass through to the retina; it's quick, done with numbing drops of 0.4% Boxinate

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hydrochloride was applied to the conjunctival sac one minute before the procedure, a special contact lens, and a machine similar to an exam slit lamp.

A recommendation not to drive immediately due to temporary blurriness from dilation drops.

You'll rest the patient chin on a slit lamp, and a contact lens might be placed on the patient eye to keep it steady and focus the laser.

- The Nd-YAG laser machine was switched on and the slit lamp was focused.
- The YAG laser makes a small hole in the cloudy posterior capsule, which supports the artificial lens.
- Sensation: You'll see bright flashes and hear a clicking sound, but it's painless.
- Duration: The laser treatment itself usually takes only a few minutes (around 10-20 minutes total for the visit).
- Laser was retro-focused by spot size 100 microns behind the focus of Helium-Neon beam which was focused on the posterior capsule.
- The procedure uses focused laser energy (typically between 0.8-5.0 mJ, depending on density of the opacity. The size of capsulotomy was designed to match the size of the scotopic pupil size. Starting by low laser power, and when the opacity not respond to treatment the power increasing to open the capsule.

Posterior capsular incision was done in a cruciate manner, started from 12 o'clock position and proceed towards 6 o'clock position. Laser shots were then applied from the center towards 3 and 9 o'clock positions. All energy power and number of shots were reported for each eye. The total energy level was then calculated by multiplying the energy level and number of shots.

Post Laser management:

The following medications were prescribed after the procedure:

- Topical combination of 0.1 dexamesathone and 0.3 tobramycin eye drops four times daily for 1 week.
- Topical 0.5% timolol maleate eye drops twice daily was prescribed if IOP exceeds 22 mmHg at any of the follow up visits.

Follow up was done after two hours after the procedure, one day, one week, and finally at one month after YAG. At each visit, each patient was undergone the following examinations:

- Measuring UCDVA & BCDVA.

- Slit lamp examinations for :anterior chamber evaluation depth and content , cornea, status of IOL to detect any damage, any evidence of iritis and the anterior vitreous face.

- IOP measurement using the Goldmann applanation tonometry.

- Indirect ophthalmoscopy to detect any posterior segment complication.

- Notation for any complications

Statistical Analysis

- IBM Statistical Package for the Social Sciences, version 23, was used to record, edit, and code the data. This data was input by SPSS Inc. of Chicago, Illinois, USA. For parametric (normal) quantitative data, the standard deviations and ranges were used to represent the data, while for non-parametric variables, the median with interquartile range (IQR) was used. Quantitative and qualitative factors were also displayed using percentages and counts. The Kolmogorov-Smirnov and Shapiro-Wilk tests were used to examine the data for signs of normality. The comparison between groups with qualitative data were done by using Chi-square test. Two paired groups were compared using the Paired t-test for quantitative data with parametric distribution and the Wilcoxon Rank test for non-parametric distribution. $P \leq 0.05$: was considered substantial.

Data collection:

The following parameters were recorded :

Demographic data(age, sex, laterality), Clinical data (BCDVA,pre and post IOP, intra and postoperative complications , operative success).

RESULTS

It included 60 eyes of 44 patients (26 males, 59.1%) and (18 females, 40.9%) with mean age \pm SD was 62.2 ± 7.6 years. All patients had significant PCO , and were prepared for performing YAG laser capsulotomy.

Patients were divided into two equal groups:

Group A: Included 30 eyes in 19 diabetic patients (12 males, 63.2 % and 7 females, 36.8%).

Group B: Included 30 eyes in 25 non-diabetic patients (14 males, 56.0 % and 11 females, 44.0%). There was substantial difference across groups according to sex ($P= 0.115$).

The mean age \pm SD in group A was 60.9 ± 6.8 years, while in group B it was 63.6 ± 7.7 years. There was substantial difference across groups according to sex ($P= 0.264$).

Table (1): Age and Sex distribution among the two Groups

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	Mean Age \pm SD (Years)	Sex	
		Males	Females
GROUP A (Diabetic)	60.9 \pm 6.8	12 (63.2%)	7 (36.8%)
GROUP B (Non-Diabetic)	63.6 \pm 7.7	14 (56.0%)	11 (44.0%)

Right eyes were reported in 32 eyes (53.3%), while left eyes were reported in 28 eyes (46.7%). The difference across eyes as the laterality was insubstantial (P= 0.082).

The mean time interval between cataract removal and YAG laser capsulotomy \pm SD was 22.2 \pm 9.6 months in group A and 25.4 \pm 7.9 months in group B with no significant difference (P= 0.166).

As regards the type of PCO in Group A, 22 eyes (73.3%) had the fibrous type and 8 eyes (26.7%) had Elschnig's pearls, while in Group B, 21 eyes (70%) had the fibrous type and 9 eyes (30%) had Elschnig's pearls. The difference across groups A and B as regards the type of PCO was insignificant (P= 0.461).

Table (2): Type of PCO among the two Groups

	Fibrous type of PCO	Elschnig's pearls
GROUP A (Diabetic)	22 eyes (73.3%)	8 eyes (26.7%)
GROUP B (Non-Diabetic)	21 eyes (70%)	9 eyes (30%)

In our study, the fibrotic type needed more number of shots, higher pulse power and higher total energy power than the Elschnig pearls. The relations between these laser parameters and the types of posterior capsular opacification were significant in both groups. Tables (3a and 3b) showing the relation between the type of posterior capsular opacification and the mean number of shots, pulse power and the total energy power used for capsulotomy in both groups.

Table (3a): Group A, The relation between, number of shots, pulse power and total energy power used for capsulotomy.

	Mean \pm SD	Elschnig pearls	Fibrotic	P-value	Sig.
		Mean \pm SD	Mean \pm SD		
Mean No. of shots	22.13 \pm 8.43	35.54 \pm 10.06		0.026	S
Mean Pulse power (mJ)	2.42 \pm 0.53	3.62 \pm 0.80		0.018	S
Mean Total energy (mJ)	53.55 \pm 17.22	128.65 \pm 26.02	28	0.044	S

Table (3b): Group B, The relation between, number of shots, pulse power and total energy power used for capsulotomy..

	Mean \pm SD	Elschnig pearls	Fibrotic type	P-value	Sig.
		Mean \pm SD	Mean \pm SD		
Mean No. of shots	24.81 \pm 8	36.51 \pm 10		0.021	S
Mean Pulse power (mJ)	2.73 \pm 0.5	3.21 \pm 0.6		0.025	S
Mean Total energy (mJ)	67.73 \pm 19	117.19 \pm 21.77		0.040	S

In our study, dense PCO needed a higher total energy power than PCO of moderate density in both groups. The difference between the density of PCO and the total energy power was significant in both groups. Table 4

Table (4): Comparison between two groups as regard total energy power used for density of the opacity

	Mean \pm SD	Moderate PCO	Dense PCO	P-value	Sig.
		Mean \pm SD	Mean \pm SD		
Group A	51.04 \pm 14	139.41 \pm 10		0.018	S
Group B	50.10 \pm 14	136.21 \pm 14.32		0.042	S

In both groups, clearing pupillary opening by YAG laser Nd-YAG laser was effective in all eyes (100%) in one session. None of the patients required retreatment.

As regards BCVA in Group A at the end of follow up period (at one month follow up) all eyes (100%) had 0.3 or better, 25 eyes (83.3%) had 0.5 or better, while 1.0 was achieved in 16 eyes (53.3%). Differences between BCDVA before YAG laser capsulotomy and at follow up at two hours, one day were significant (P=0.022, 0.017 respectively), while the differences at one week and one month after laser capsulotomy were highly significant (0.001 and 0.001

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respectively). There was no decrease in BCDVA after performing the procedure in all cases. BCDVA was stable at one week after Nd-YAG laser posterior capsulotomy with no more improvement at one month. In Group B at the end of follow up period (at one month follow up) all eyes (100%) had visual acuity (0.4) or better, 28 eyes (93.3%) had visual acuity (0.5) or better, while visual acuity (1.0) was achieved in 17 eyes (56.6%). Differences between BCDVA before YAG laser capsulotomy and at two hours, one day, after capsulotomy were significant (P = 0.016 and 0.015 respectively), as regard BCDVA at one week and one month after the operation were highly significant (P = 0.004 and 0.004 respectively). There was no decrease in BCDVA after laser capsulotomy and the visual acuity was stable at one week after YAG laser capsulotomy with no more improvement at one month. As regards BCDVA, differences between both groups were non-significant before and after YAG laser capsulotomy the follow up visits (P > 0.05). Table 5)

Table (5): Comparison between both Groups as regards BCDVA after YAG laser capsulotomy

BCVA		Group A	Group B	P-value	Significance
Pre-Laser BCVA	0.3 better	17 eyes (56.6%)	19 eyes (63.3%)	0.82	Non-sig.
	0.4 better	13 eyes (43.3%)	15 eyes (50.0%)	0.86	Non-sig.
	0.5 better	9 eyes (30.0%)	11 eyes (36.6%)	0.74	Non-sig.
	1.0 better	No eyes (0%)	No eyes (0%)	1.26	Non-sig.
Post-Laser BCVA	0.3 better	30 eyes (100%)	30 eyes (100%)	1.61	Non-sig.
	0.4 better	29 eyes (96.6%)	30 eyes (100%)	1.02	Non-sig.
	0.5 better	25 eyes (83.3%)	28 eyes (93.3%)	0.94	Non-sig.
	1.0 better	16 eyes (53.3%)	17 eyes (56.6%)	0.87	Non-sig.

IOP changes:

Intraocular pressure was reported 2 hours, 1 day, 1 week, and 1 month following the Nd-YAG laser posterior capsulotomy procedure and the results were as follows:

In Group A:

Nineteen eyes out of 30 (63.3%) showed IOP elevation ≤ 5 mm Hg at 2 hours after Nd-YAG laser posterior capsulotomy, while 2 eyes (6.6%) had a rise of more than 5 mm Hg above the pre-laser level. At 1 week after laser capsulotomy 3 eyes

(10%) showed increased IOP ≤ 5 mmHg above the pre-laser level, while only one eye had increased IOP more than 5 mmHg above the base line at 1 week after Nd-YAG laser posterior capsulotomy. No IOP elevation above the pre-laser level at the end of follow up visits at one month. IOP did not exceed 22 mmHg in any case at the end of follow up visits, and the rise in IOP was transient. Mean baseline IOP before Nd-YAG laser posterior capsulotomy \pm SD was 13.45 ± 2.89 mmHg. At 2 hours after capsulotomy, it was 15.47 ± 3.59 mmHg. One day after capsulotomy, it was 14.06 ± 3.22 mmHg. One week after capsulotomy, it was 13.81 ± 2.63 mmHg. One month after capsulotomy, it was 13.64 ± 2.63 mmHg. The difference between mean pre-laser and 2 hours after laser capsulotomy was substantial (P = 0.001) and was significant after 1 day (P = 0.034). Differences were insignificant after 1 week (P = 0.319) and 1 month (P = 0.276).

In Group B:

Twenty two eyes out of 30 (73.3%) showed IOP elevation ≤ 5 mmHg at 2 hours after Nd-YAG laser capsulotomy. Two eyes (6.6%) had a rise of more than 5 mmHg. At one week after laser capsulotomy 4 eyes (13.3%) showed increased IOP ≤ 5 mm Hg above the base line. Two eyes out of 30 (6.6%) had increased IOP more than 5 mm Hg and less than 10 mmHg above the base line at one week after capsulotomy. At one month follow up, no IOP elevation more than 5 mmHg was observed. As in Group A, IOP did not exceed 22 mmHg in any case at the end of follow up visits and the rise in IOP was transient. Mean baseline IOP before Nd-YAG laser posterior capsulotomy \pm SD was 14.19 ± 2.76 mmHg. At 2 hours after Capsulotomy, it was 16.01 ± 3.92 mmHg. One day after capsulotomy, it was 14.88 ± 3.64 mmHg. One week after capsulotomy, it was 14.92 ± 2.40 mmHg. One month after capsulotomy, it was 13.92 ± 2.18 mmHg. The difference between mean pre IOP, two hours and one day after capsulotomy was highly substantial (P<0.05). While the differences after one week and one month were insignificant (P > 0.05).

As regard IOP differences between both groups were non-significant at two hours, one day, one week and one month after laser capsulotomy (P>0.05).

Table (6): Mean IOP before and after capsulotomy in both groups

Pre-laser IOP	2 hour	Day 1	1 week	1 month

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Group A	13.45 ± 2.89	14.06 ± 3.22	15.47 ± 3.59	13.81 ± 2.63	13.64 ± 2.63
Group B	14.19 ± 2.76	16.01 ± 3.92	14.88 ± 3.64	14.92 ± 2.40	13.92 ± 2.18
P-value	0.141	0.922	0.743	0.481	0.638
Significance	nile.	Nile.,	Nile.	Nile.	Nile.

In our study there were no persistent IOP elevation at the end of the one month after capsulotomy in both groups, and IOP returned to the Pre-laser IOP level by the end of the follow up visit at one month in both groups. IOP elevation was reported to be more than 22 mmHg in one case in Group A at one day after Nd-YAG laser posterior capsulotomy, while it was reported in two cases in Group B at the same follow up visit. Topical 0.5% timolol maleate eye drops twice daily was prescribed. It was stopped at one week follow up as IOP dropped below 14 mmHg. At one month follow up these cases were at the level of the pre-laser IOP. No glaucomatous fundus changes were observed in any of these cases.

Other complications of Nd-YAG laser posterior capsulotomy

Group A

a. **IOL pitting** was reported in two cases (6.6%). No IOL cracks was reported. Patients with IOL pits did not report glare or halos. They had dense opacified posterior capsule. Laser pulse powers in these two eyes were 4.1 and 4.0 mJ, compared to eyes without IOL pits (Mean laser pulse power ± SD was 2.02 mJ ± 0.39).

b. **Iritis** was reported in one case (3.3%). It was reported at the follow up visit at one day after Nd-YAG laser posterior capsulotomy. Total energy power in this case was 142.8 mJ, compared to eyes without iritis (Mean ± SD was 88.19 ± 12.54 mJ). Topical corticosteroid 1 % eye drops (every 2 hours) and topical combination of 0.1 dexamethasone and 0.3 tobramycin eye ointment (once at bed time) were prescribed. Complete resolution was reported at follow up at one week after capsulotomy. No hyphaema, corneal oedema, corneal decompensation or posterior segment complications were reported in any eye of group A.

Group B

a. **IOL pitting** was reported in two cases (6.6%). No IOL cracks was reported. Patients with IOL pits also did not report glare or halos. They also had dense opacified posterior capsule. Laser pulse powers in eyes complicated by IOL pits were 3.8 and 4.1 mJ, compared to eyes without IOL pits (Mean laser pulse power ± SD was 1.92 mJ ± 0.34).

b. **Iritis** was reported in one eye (3.3%). Iritis was diagnosed at one day after Nd-YAG laser posterior capsulotomy. Total energy power ± SD was 136.38 compared to eyes without iritis (Mean ± SD was 88.78 ± 12.54 mJ). Topical prednisolone acetate 1 % eye drops (every 2 hours) and topical combination of 0.1 dexamethasone and 0.3 tobramycin eye ointment (once at bed time) were prescribed. Complete resolution was reported one week after Nd-YAG laser posterior capsulotomy.

Also in group B, no hyphaema, corneal oedema, corneal decompensation or posterior segment complications were reported.

Table (7): Comparison across groups A and B as regards complications after Nd-YAG laser posterior capsulotomy

Complications	Group A	Group B
Chipping of intraocular lens	2 (6.6%)	2 (6.6%)
Iritis	1 (3.3%)	2 (6.6%)
Hyphaema	0 (0%)	0 (0%)
Corneal oedema or decompensation	0 (0%)	0 (0%)
Posterior Segment complications	0 (0%)	0 (0%)

DISCUSSION

In this study, 60 eyes of the 44 patients (26 males, 59.1%) and (18 females, 40.9%) were included in the study. Their mean age ± SD was 62.2 ± 7.6 years. All had significant opacification of the posterior capsule after surgery and were prepared for YAG laser capsulotomy. Two equal divided groups in this study: **Group A:** Included 30 eyes in 19 diabetic patients and **Group B:** Included 30 eyes in 25 non-diabetic patients.

Belvi et al., (2016) reported that; 67.2% were males while 32.8% were females this was agree with **Ioana et al.,(2017)** in their study 62% cases were males while 38% were females respectively.

In this work, mean time interval between cataract surgery and Nd-YAG laser was ± SD was 22.2 ± 9.6 months in group A, while it was 25.4 ± 7.9 months in group B. The difference was insignificant.

Paul (2018) reported that; patients with PCO who were presented for laser capsulotomy (0-12) months after cataract surgery were 8%, 12-24 months were 38%, 24-36 months were 31% and > 36 months were 23%.

In this study, the fibrotic type in group A was reported in 22 eyes (73.3 %), while Elschnig's pearls were reported in 8 eyes (26.7%)., while the fibrotic type of PCO was reported in 11

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eyes (70%), and Elschnig's pearls were reported in 9 eyes (30%) in group B. **Mukesh et al. (2018)** reported that the majority of PCO patients (86%), namely capsular fibrosis, were seen in this condition. **Bo et al. (2018)** found that; the predominant type of PCO was capsular fibrosis (62%).

As regard cleaning of the pupillary area in our study in both groups, All eyes had their pupillary openings cleared in a single session with the Nd-YAG laser. Retrenchment was not necessary for any of the patients.

As regards BCVA in Group (A) at the end of follow up period (at one month follow up) all eyes (100%) had 0.3 or better, eyes (83.3%) had 0.5 or better, while 1.0 was achieved in eyes (53.3%). Differences between BCVA before capsulotomy and at follow up at two hours, one day and one month after laser capsulotomy were highly substantial. There was decrease in BCDVA after capsulotomy in all cases. BCDVA was stable at one week after laser with no more improvement at one month.

In Group (B), at the end of follow up period all eyes (100%) had visual acuity (0.4) or better, 28 eyes (93.3%) had visual acuity(0.5) or better, while visual acuity (1.0) was achieved in 17 eyes (56.6%). Differences between BCDVA before capsulotomy and at two hours, one day, after capsulotomy were significant, but at one week and at one month after laser capsulotomy the differences were highly significant. There was no decrease in BCDVA after laser capsulotomy in any case and BCDVA was stable at one week after YAG laser capsulotomy with no more improvement at one month.

Differences between both groups were non-significant regards BCVA. **Satyavathi and Shyam (2017)** reported a study included 53 eyes found that; (82.9%) had a visual acuity of 6/9 or better and reported that; although the procedure may be associated with some complications and risks, yet as a comparison visual outcome, complications rates are very low.

Pragati et al., (2017) reported that; the raise IOP was due to inflammatory cells and deposition of cells and debris in the trabeculum meshwork, pupillary block and inflammation angle, iris and ciliary body with angle closure glaucoma. **Mayuri and Gautam (2017)** reported that; the raise IOP was due to presence of inflammatory cells and flare in the anterior chamber angle which blocks the trabecular meshwork causing increase IOP, and all the cases were treated by topical corticosteroids .

As regards IOP in our study: In Group A, nineteen eyes (63.3%) showed IOP elevation ≤ 5 mm Hg at 2 hours after Nd-YAG laser posterior capsulotomy, while 2 eyes (6.6%) had a rise of more than 5 mm Hg above the pre-laser level. At 1 week after laser capsulotomy 3 eyes (10%) showed increased IOP ≤ 5 mmHg above the pre-laser level, while only one eye had increased IOP more than 5 mmHg above the base line at 1 week after Nd-YAG laser posterior capsulotomy. IOP did not exceed 22 mmHg in any case at the end of follow up visits, and the rise in IOP was transient. The difference between mean pre-laser and 2 hours after laser capsulotomy was statistical highly significant, and was significant after 1 day. Differences were insignificant after 1 week and 1 month.

In Group B: twenty two eyes (73.3%) showed IOP elevation ≤ 5 mmHg at 2 hours after Nd-YAG laser posterior capsulotomy. Two eyes (6.6%) had a rise of more than 5 mmHg. At 1 week after laser capsulotomy 4 eyes (13.3%) had increased IOP ≤ 5 mm Hg above the base line. Two eyes (6.6%) had increased IOP more than 5 mm Hg and less than 10 mmHg above the base line at 1 week after Nd-YAG laser posterior capsulotomy. As in Group A, IOP did not exceed 22 mmHg in any case at the end of follow up visits and the rise in IOP was transient. The difference between mean pre-laser IOP and two hours after laser capsulotomy was statistical highly significant ($P = 0.001$), and was significant after 1 day ($P = 0.042$). Differences were insignificant after one week and one month. This study was agree with study reported by **Umer et al., (2024)** who reported that; both groups showed no statistically significant difference during the post-procedure follow-up appointments. Two hundred individuals, ranging in age from 26 to 60 years old, with a prior history of cataract surgery within the last six months to three years. At one, two, four, and twenty-four hours post-YAG, intraocular pressure (IOP) was assessed in half of the diabetic and half of the non-diabetic patients. In the group with diabetes, the average intraocular pressure (IOP) before the laser treatment was 14.72 ± 2.67 mmHg, while in the group without diabetes, it was 14.36 ± 1.47 mmHg. ($P=0.0001$, the average intraocular pressure (IOP) one hour following laser therapy was 19.17 ± 3.16 in the diabetes group and 15.62 ± 2.33 in the non-diabetic group. Compared to the non-diabetic group, whose mean IOP difference at first hour was 1.26 mmHg, the diabetic group had a substantially higher value of 3.55 mmHg. According to the results of this study, intraocular pressure (IOP) increases in the first two hours following YAG

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and then progressively returns to pre-laser levels after twenty-four hours. A substantial difference exists across the diabetic and non-diabetic groups with respect to the mean intraocular pressure (IOP) differential at one hour. Also, this study agrees with *Parajuli et al., (2023)* reported 96 eyes in patients (54 male and 29 female patients). Mean total energy levels were 26.64 ± 12.92 mJ in Group I and 81.96 ± 32.10 mJ in Group II. They found that IOP increased at first hour postoperatively (P=0.023) and gradually decreased to preoperative levels one month. Mean pre-laser IOP was 14.51 ± 2.53 mmHg, and one hour after laser, it was 14.98 ± 2.28 mmHg, and at one month after laser, it was 14.64 ± 2.16 mmHg, and also none of the patients underwent antiglaucoma surgery before or after the procedure. They did not observe any serious rise in IOP

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CONCLUSIONS:

- YAG laser PCO is a safe, noninvasive and effective treatment. But raised IOP is the most frequent complication especially two hours following the procedure and return to pre-laser IOP one week later.

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