

Refraction and Intraocular Pressure Changes After YAG Laser Posterior Capsulotomy in Posterior Capsular Opacification

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ABSTRACT

Background: Posterior capsular opacification (PCO), often known as "secondary cataract" PCO is formed by remained sub-capsular epithelial lens cells which migrate, proliferate and differentiate leading to opacity with drop of vision and other visual disturbance as blurring specially when it involves visual axis.

Aim of The Work: To investigate the Effect of YAG Laser Capsulotomy for Posterior Capsular Opacification in Pseudophakic eyes on Refraction, Astigmatism and Intraocular Pressure of Patient before and after treatment.

Patients and Methods: This study conducted on 50 eyes of 36 patients with PCO attending the outpatient ophthalmology clinic of Al-Azhar University hospitals (Cairo branch) during the period from March 2021 to December 2021.

Results: A statistically significant improvement in UCVA, BCVA, refraction, and IOP was found at follow-up compared to pre-session (p-value<0.05), but no change in Cylinder, Axis, or K readings.

Conclusion: The Nd: YAG laser capsulotomy approach is a non-invasive outpatient treatment option for PCO that significantly improves UCVA and BCVA while having a little effect on refraction and IOP. It is straightforward, quick, and typically safe.

Keywords: Refraction; Intraocular Pressure; YAG.

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INTRODUCTION

The Most common cause of blindness and vision diminution in the world is Cataract with its all-different types, Cataract treatment was only surgical. Cataract surgery developed over years and nowadays the most common types are Phacoemulsification and extracapsular cataract extraction (ECCE).¹

It is common for patients to develop Posterior Capsular Opacification within months or years after undergoing a routine cataract extraction procedure. PCO may cause visual impairments such as foggy or hazy vision, poor contrast sensitivity, halos around lights, and difficulty in reading.¹

This condition is known medically as "secondary cataract", which is formed by the remaining sub-capsular epithelial lens cells that migrate, proliferate and differentiate leading to opacity, decreased visual acuity and other visual disturbances as blurring of vision especially when involving visual axis¹

PCO incidence is between 20% and 50% of patients who have a routine cataract extraction procedure. There is no substantial data to support claims that PCO prevalence has decreased in recent years² PCO is more prevalent in newborns and babies, and if it develops

early, it may result in amblyopia.^{3, 4, 5} Some reports stated that PCO is almost universal in children.^{4, 6}

In PCO vision is reduced as a result of LECs accumulation and of pacification the intact posterior lens capsule. This results in light dispersion reducing visual acuity.¹

other factors affecting PCO incidence may include cytokines and growth factors, like transforming growth factor β , fibroblast growth factor 2 (FGF-2), and hepatocyte growth factor (HFG), as well as matrix metalloproteinases (MMOs). Exogenous hyaluronic acid (HA), which is an ingredient of numerous visco-elastic polymers used in the surgery, may enhance the incidence of PCO.⁷

PCO has been treated by YAG laser capsulotomy; a procedure that creates an opening in the posterior capsule.⁹ Dr. Aron-Rosa was able to operate it at a range of wavelengths. In October 1978, she began conducting clinical trials. Over the following several years, 5000 eyes were cured.¹⁰ In November 1980, Fankhauser did his first YAG Session.¹¹

Previously, PCO was treated surgically, but now YAG Laser is the preferred therapy since it is non-

invasive, quick, and successful; nevertheless, many developing countries do not have access to this treatment. Only a few potential adverse effects including IOL pitting, retinal detachment, IOP rise, corneal edema, IOL subluxation, iritis, macular hole, and the loss of corneal endothelial cells.⁴

Visual Symptoms is the main indication for YAG including increased glare, interfering with daily activities of patient, the other indication is to improve fundus viewing.

PATIENTS AND METHODS

Prospective interventional study included 50 eyes [17 eyes of males (33.3%), 33 eyes of females (66.7%)] with an average age from 22 to 70 [mean age 48.28 ± 15.39] with posterior capsule opacification. Medical committee of ethics of Al-Azhar University, faculty of medicine approved the study. Informed consent was obtained from all participants included in the study after the nature and possible complication of the procedure was explained.

Inclusion criteria:

The patients with posterior capsule opacification after uncomplicated cataract surgery depend on their severity of PCO if mild or moderate.

Exclusion criteria:

Start with Patients less than 18 years old or who refused to participate in the study, patient with complicated cataract surgery or any ocular disease that may affect the study, very dense PCO or pregnant patients.

Preoperative Evaluation:

History taking and Preoperative ophthalmological examination:

Snellen's chart and the Landot C optotype (which was subsequently translated to the logarithm of the minimum angle of resolution (log MAR) scale) were used to compute the UCVA and BCVA, respectively, followed by Slit lamp Examination to assess Cornea, AC, Pupil reaction, IOL and Fundus using non-contact Volk 90 Diopter lens and diagnosis of PCO and grading.

Refraction using automated refractometer (KR-800; Topcon Corporation, Tokyo, Japan), Intraocular pressure (IOP) by Goldman Applanation tonometer (CT-80 Topcon Corporation) and Sirius- Shine-Flag Cam.

Operative steps and technique:

After explain the Procedure, Inform the patient about the procedure's aims, length, level of pain, and requirement for a solid fixation. It may seem as a little clicking noise to his ears. Informed Consent: Should obtained prior to the procedure. Pupillary Dilation (Mydriasis) by used Tropicamide (1% concentration) and phenylephrine hydrochloride (2.5%) gave total mydriasis alleviation and Topical anesthesia was by using Benoxinate hydrochloride 0.5% eye drops

Comfortable Sitting of Patient: Adjustable stool and chinrest should comfortably adjusted to relax the patient. Steady Fixation Obtained by head strap prevents the patient from pulling their head back during Session then changing the brightness of the lighted target as required.

Contact Lens: Abraham capsulotomy YAG laser lens with lubricating gel (methylcellulose) used during the capsulotomy.

Room Illumination: By darkening or semi-darkening the laser chamber, surgeons may more precisely focus the laser beam on their target.

Slit-lamp Beam: It should be thin in form and have an acute angle. This provides information on the pupil's size under ambient light. Prior to a laser session, it is critical to adjust the slit-oculars. lamp's The slit light and aiming beams were moved to become Para focused for optimal performance.

Capsulotomy Technique:

We use an average 3.5 ± 0.5 mJ / pulse from Q-LAS Nd: YAG laser, which was enough to open posterior capsule.

In intractable thick posterior capsules, the energy setting per pulse may be increased.

Begin with low energy and progressively increase as needed. Use the least amount of energy every pulse to make an opening in the posterior capsule.

In this study the average total laser shots was 35-60 with mean 48.09 and \pm SD 9.18 among YAG session which was sufficient to create an adequate and optimum opening in the posterior capsule

The size of the capsulotomy is dictated by the pupil size under ambient light settings (approx.4-5 mm).

All Shots completed in one session for the patient.

Postoperative Management

All patients were given topical non-steroidal anti-inflammatory eye drops four times / day and Brimonidine tartrate 0.2% for one week following session (post Laser therapy).

Follow-Up Schedule

The postoperative visit scheduled within first week then after Month to do an ophthalmic examination of the Patients including BCVA, Slit lamp check, IOP measurements, Refraction measurements and corneal topography Sirius CSO (after 1 month).

Statistical analysis:

The recorded data evaluated using the statistical software for social sciences, version 23.0. (SPSS Inc., Chicago, Illinois, USA). In terms of numbers, we had medians, interquartile ranges, and the like.

The following tests were done:

For non-parametric data, use the Wilcoxon Signed-Rank Sum test to compare differences across time.

The Kruskal-Wallis test is used for multiple-group comparisons when analyzing non-parametric data.

Friedman The significance test was used for comparing similar samples.

For non-parametric two-group comparisons, the Mann Whitney U test was used.

One-way analysis of variance should be used to compare more than two means (ANOVA).

For numerous comparisons between variables, Tukey's test was used in the post-hoc test.

A 95 percent confidence range and a 5% acceptable error tolerance were used in this study. Because of this, the p-value considered significant:

Probability (P-value)

P-value < 0.05 considered significant.

P-value < 0.001 considered as highly significant.

P-value > 0.05 considered insignificant.

RESULTS

Tables showing the investigations and conclusions presented below. We studied the effect of YAG Capsulotomy in Pseudophakic eyes with PCO on Refraction, Astigmatism and Intraocular Pressure of Patient before and after treatment and we applied our study on 36 patients with the same inclusion and exclusion criteria.

Baseline characteristics		Total (n=50 eye)
Age (years)*	Range	22–70
	Mean±SD	48.28±15.39
Sex*	Female	24 (66.7%)
	Male	12 (33.3%)
Side	OD	26 (52.0%)
	OS	24 (48.0%)
Operation type	Uncomplicated ECCE	4 (8.0%)
	Uncomplicated PHACO	46 (92.0%)
IOL	Foldable PMMA	46 (92.0%)
		4 (8.0%)
Posterior capsule opacity (PCO) Grading	I	10 (20.0%)
	II	24 (48.0%)
	III	16 (32.0%)

Table 1: Baseline characteristics distribution among study group (n=50 eye)

YAG session	Range	Mean±SD
Shots Numb.	10–15	12.56±1.85
Energy	3.5–4	3.80±0.18
Total energy	35–60	48.09±9.18

Table 2: YAG session descriptive among study group.

The ranged shots number was 10–15 and mean was 12.56 and ±SD 1.85; while energy ranged 3.5-4 with mean 3.8 and SD 0.18, also ranged of total energy 35-60 with mean 48.09 and ±SD 9.18 among YAG session.

Measurements	Uncorrected visual acuity “UCVA” (LogMar)		Wilcoxon's rank sum test		
	Range	Mean±SD	Mean Diff.	z-test	p-value
Pre session	0.3–1	0.70±0.26A			
After 1 wk.	0.18–1	0.52±0.25B	-0.18	-5.046	<0.001**
After 1 month	0.18–1	0.49±0.25B	-0.21	-5.422	<0.001**

Values in each column which have different letters are significantly different at (P<0.05) using Friedman Test; p-value <0.05 S; *p-value <0.05 S; **p-value <0.001 HS.

Table 3: Comparison between pre session of UCVA “LogMar” and other measurements “After 1wk. and after 1months” among study group

We reported changes statically improvement of UCVA in follow up compared to pre session with p-value < 0.05; while there is ; while did not find statically different changes after 1wk. and after 1months with p-value (p>0.05).

Measurements	Auto-Refractometer "AR" SPH		Wilcoxon's rank sum test		
	Range	Mean±SD	Mean Diff.	z-test	p-value
Pre session	-2.75–4.5	1.51A±0.06			
After 1 wk.	-2.5–2	1.21B±0.11	0.05	-2.195	0.047*
After 1 month	-2.5–2	1.21B±0.11	0.05	-2.195	0.047*

Values in each column which have different letters are significantly different at (P<0.05) using Friedman Test; p-value <0.05 S; *p-value <0.05 S; **p-value <0.001 HS.

Table 4: Comparing between pre session of Auto-Refractometer "AR" SPH and other measurements "After 1wk. and after 1months" among study group

There was statistically significant improvement in follow up compared to pre session with p-value < 0.05; while we did not find significant changes statistically between after 1wk. and after 1months with p-value (p>0.05).

Measurements	Auto-Refractometer "AR" Cylinder		Wilcoxon's rank sum test		
	Range	Mean±SD	Mean Diff.	z-test	p-value
Pre session	-3.25–0.5	-1.58±0.88A			
After 1 wk.	-3–0.225	-1.36±0.72B	0.22	-2.068	0.038*
After 1 month	-3–0.75	-1.38±0.82B	0.20	-2.169	0.038*

Values in each column which have different letters are significantly different at (P<0.05) using Friedman Test; p-value <0.05 S; *p-value <0.05 S; **p-value <0.001 HS.

Table 5: Compared between pre session of Auto-Refractometer "AR" Cylinder and other measurements "After 1wk. and after 1months" among study group

There was statistically significant improvement in follow up compared to pre session with p-value <0.05; while there is no significant difference between after 1wk. and after 1months with p-value (p>0.05).

Measurements	Auto-Refractometer "AR" Axis		Wilcoxon's rank sum test		
	Range	Mean±SD	Mean Diff.	z-test	p-value
Pre session	15–170	100.96±28.69A			
After 1 wk.	10–180	95.72±36.74B	-5.24	-2.400	0.041*
After 1 month	10–180	96.12±37.16B	-4.84	-2.066	0.039*

Values in each column which have different letters are significantly different at (P<0.05) using Friedman Test; p-value <0.05 S; *p-value <0.05 S; **p-value <0.001 HS.

Table 6: Compare between pre session of Auto-Refractometer "AR" Axis and other measurements "After 1wk. and after 1months" among study group

There was statistically significant improvement in follow up compared to pre session with p-value <0.05; while there is no statistically between after 1wk. and after 1months with p-value (p>0.05).

Measurements	Best corrected visual acuity "BCVA" (LogMar)		Wilcoxon's rank sum test		
	Range	Mean±SD	Mean Diff.	z-test	p-value
Pre session	0.18–0.48	0.33±0.12A			
After 1 wk.	0–0.3	0.15±0.09B	-0.18	-5.990	<0.001**
After 1 month	0–0.3	0.12±0.09B	-0.21	-6.244	<0.001**

Values in each column which have different letters are significantly different at (P<0.05) using Friedman Test; p-value <0.05 S; *p-value <0.05 S; **p-value <0.001 HS.

Table 7: Compare between pre session of Best corrected visual acuity "BCVA" (LogMar) and other measurements "After 1wk. and after 1months" among study group

There was statistically significant improvement in follow up compared to pre session with p-value <0.001; while did not find different changes statically between after 1wk. and after 1months with p-value (p>0.05).

Measurements	Intraocular pressure (IOP)		Wilcoxon's rank sum test		
	Range	Mean±SD	Mean Diff.	z-test	p-value
Pre session	12–22	15.88±2.46A			
After 1 wk.	11–21	14.84±1.91B	-1.04	-3.891	<0.001**
After 1 month	11–20	14.80±1.87B	-1.08	-3.517	<0.001**

Values in each column which have different letters are significantly different at (P<0.05) using Friedman Test; p-value <0.05 S; *p-value <0.05 S; **p-value <0.001 HS.

Table 8: Compare between pre session of intraocular pressure (IOP) and other measurements "After 1wk. and after 1months" among study group.

There was statistically significant improvement in follow up compared to pre session with p-value < 0.05; while ; while did not find different changes statically between after 1wk. and after 1months with p-value (p>0.05).

Measurements	Corneal topography		Wilcoxon's rank sum test		
	Range	Mean±SD	Mean Diff.	z-test	p-value
Keratometer 1 reading					
Pre session	42.21–48.83	44.29±1.54	-0.50	-3.827	<0.001**
After 1 month	41.37–46.06	43.79±1.37			
Keratometer 2 reading					
Pre session	43.13–47.69	45.40±1.26	-0.22	-3.134	0.002*
After 1 month	43.08–47.97	45.18±1.39			
Average					
Pre session	42.7–47.13	44.68±1.24	-0.32	-4.331	<0.001**
After 1 month	42–46.99	44.36±1.43			

Values in each column which have different letters are significantly different at (P<0.05) using Friedman Test; p-value <0.05 S; *p-value <0.05 S; **p-value <0.001 HS.

Table 9: Compare between pre session of Sirius CSO and after 1months among study group

According to Keratometer 1 readings, there is significant difference statistically with p-value between pre session and after 1 month (p<0.05).

Additionally there is significant difference statistically between pre session and after 1month according to Keratometer 2 reading with p-value (p<0.05).

Also, there significant difference statistically between pre session and after 1month according to average reading with p-value (p <0.05).

Measurements	Sirius CSO: Cylinder		Wilcoxon's rank sum test		
	Range	Mean±SD	Mean Diff.	z-test	p-value
Cylinder					
Pre session	-2.5–0.6	-1.29±0.83	0.13	-0.441	0.659
After 1m	-2.45–1.87	-1.15±0.96			
Axis					
Pre session	15–180	94.56±43.91	12.00	-2.707	0.007*
After 1m	10–180	106.56±45.00			

Values in each column which have different letters are significantly different at (P<0.05) using Friedman Test; p-value <0.05 S; *p-value <0.05 S; **p-value <0.001 HS.

Table 10: compared corneal astigmatism by Sirius CSO (cylinder) between pre session and after 1months among study group

We did not report different changes statically between pre session and after 1month according to cylinder with p-value (p>0.05).

Delta change (Pre-After 1m)	Grade 1 (n=10)	Grade 2 (n=24)	Grade 3 (n=16)	H-test	p-value
UCVA (LogMar)	-0.35±0.21A	-0.26±0.16B	-0.11±0.11C	3.163	0.028*
Auto-Refractometer					
SPH	-0.15±0.36	0.23±0.48	-0.33±1.85	1.316	0.278
Cylinder	-0.25±0.41	0.29±0.95	0.50±0.71	2.802	0.071
Axis	2.80±8.68	6.25±27.67	-10.00±22.66	2.359	0.106
BCVA (LogMar)	-0.26±0.08A	-0.19±0.06B	-0.12±0.08C	4.325	0.019*
IOP	-1.38±2.06A	-1.00±1.77B	-0.80±1.69C	2.941	0.047*
Corneal topography Sirius CSO					
K1	-0.31±0.44	-0.36±0.47	-0.84±2.17	0.823	0.445
K2	-0.28±0.35	-0.13±0.58	-0.32±0.37	0.829	0.443
Average	-0.43±0.49	-0.35±0.62	-0.21±0.18	0.715	0.495
Cylinder					
Cylinder	0.20±0.90	0.19±1.27	0.02±0.20	0.177	0.838
Axis	-8.40±14.08A	-5.83±14.73B	-0.13±6.52C	10.844	<0.001**

Kruskal–Wallis was performed & Multiple comparison between groups through Mann-Whitney test

Values in each row which have different letters are significantly different at (P<0.05).

p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table 11: Relation between posterior capsule opacity (PCO) grading according to delta change (pre-after 1m) of UCVA (LogMar), Auto-Refractometer, BCVA (LogMar), IOP, Corneal topography, Cylinder.

There was significant difference statistically between grades following delta change (pre-after1m) of UCVA "LogMar" with p-value ($p < 0.05$). The highest value was found in grade I (-0.35 ± 0.21) followed by grade II (-0.26 ± 0.16) while the lowest value was found in grade III (-0.11 ± 0.11).

Additionally, found significant difference statistically between grades following delta change (pre-after1m) of BCVA "LogMar" with p-value ($p < 0.05$). The highest value was found in grade I (-0.26 ± 0.08) followed by grade II (-0.19 ± 0.06) while the lowest value was found in grade III (-0.12 ± 0.08).

While, there was significant difference statistically between grades following delta change (pre-after1m) of IOP with p-value ($p < 0.05$). The highest value was found in grade III (-0.80 ± 1.69) followed by grade II (-1.00 ± 1.77) while the lowest value was found in grade I (-1.38 ± 2.06).

Also, reported significant difference statistically between grades following delta change (pre-after1m) of Axis with p-value ($p < 0.05$). The highest value was found in grade I (-8.40 ± 46.08) followed by grade II (-5.83 ± 14.73) while the lowest value was found in grade III (-0.13 ± 6.52).

There is no statistically significant difference between grades according to delta change (pre-after1m) of SPH, Cylinder, Axis, K1, K2, Average k, and Cylinder.

DISCUSSION

After uncomplicated cataract surgery, PCO is most common complication.¹⁸ which is usually treated by Nd: YAG laser capsulotomy, it has the benefit of being a minimally invasive, rapid, and reasonably safe outpatient procedure.¹⁹

This procedure may cause increased intraocular pressure (IOP), injury or displacement of the intraocular lens (IOL), iridocyclitis, vitreous hemorrhage, and vitritis.²⁰

For capsulotomy, a Nd:YAG laser pulse duration of 2 or 3 nano-seconds with low millijoules (mJ) of energy is used to eliminate obstructions from one's eyesight.²¹

This study based to assess the effect of Nd: YAG laser capsulotomy on Refraction, Cornea, Best Corrected Visual Acuity (BCVA), and Intraocular Pressure (IOP).

This study was carried out on 50 eyes of 36 patients visiting the outpatient ophthalmic clinic of Al-Azhar University hospital (Cairo) between March and December 2021.

All patients who had cataract extraction by ECCE or phacoemulsification with PC IOL implantation, PCO diagnosis by slit lamp, and treated by Nd: YAG laser. These patients scheduled follow up on one week then a month.

Corneal tomography was performed for all patients one month postoperative to evaluate Refraction and Corneal State.

In our study, 66.7% of our patients were female, the mean age was 48.28 ± 15.39 years and the mean duration cataract extraction operation till the procedure was 20 months.

In the present study, participants were compared regarding pre session best corrected visual acuity "BCVA" LogMar, with the mean & \pm SD in each of measurements "after 1wk. and after 1month", pre session value was 0.33 ± 0.12 compared to follow up " 0.15 ± 0.09 and 0.12 ± 0.09 " respectively, there was statistically significant improvement in follow up compared to pre session with p-value 0.05).

This was consistent with what was proved by other studies done by Mayuri and Gautam¹⁷ whose study was on 100 eyes of 100 patients, Sirisha and Chowdary²²

whose study was on 160 eyes, 95% of the patients studied had visual improvement, Chandrakar et al.²³ & Cevher et al.²⁰.

The current study showed that pre-laser IOP was substantially higher than post-laser IOP when compared to preoperative values. Typically, the decrease in IOP was transient and reverted to normal within a few days or weeks at the most.

The most often seen effect of posterior capsulotomy is increased intraocular pressure (IOP). Regardless of how successful a preventative measure may be.¹⁸

Intraocular pressure elevation is most likely caused by an obstruction of the anterior chamber trabecular meshwork. After using topical steroid drops, the majority of patients were able to recover to their pre-laser status.¹⁷

In the present study, we prescribed non-steroidal anti-inflammatory eye drops four times a day and brimonidine tartrate 0.2% twice a day for 1 week postoperatively.

In this study we compared pre session intraocular pressure IOP with the mean & \pm SD in each of measurements "after 1wk. and after 1month". it was pre session 15.88 ± 2.46 compared to follow up " 14.84 ± 1.91 and 14.80 ± 1.87 " respectively. there was statistically significant improvement in follow up compared to pre session with p-value < 0.05 ; and this Result is due to Anti Glucoma eye drops used for one week after YAG session.

Chandrakar et al.²³ observational study at Venu Institute of Eye and Research Center in New Delhi studied 100 pairs of eyes from November 2014 to May 2016. Sixty-four percent of persons reported an increase in IOP, with 59 percent seeing a decrease in blood pressure of less than 5 mm Hg and just 5% experiencing a greater than 5 mm Hg increase in blood pressure. For a week, 5% of patients with IOP higher than 25 mm Hg received 0.05 percent timolol maleate eye drops twice daily. No individuals saw an increase in IOP one week after laser treatment.

In Maqsood and Ather¹⁹ & Gore²⁴ 56.2 % and 59.4 %, reported immediate and transient increase in IOP.

Ari et al.²⁵ reported that IOP rises with Nd:YAG Laser with low Grading and duration or low total energy.

Karahan et al.²⁶ reported that IOP levels were found to be considerably higher postoperatively in both the small and big capsulotomy groups when the effect of Nd: YAG Laser Posterior Capsulotomy Size on IOP was investigated.

When compared to the small capsulotomy group, the increasing in IOP was greater in the larger capsulotomy group. Higher rates of elevation in-group 2 might be attributed to more capsule particles liberated with greater capsulotomies. They advise glaucomatous and non-glaucomatous individuals to take apraclonidine hydrochloride 0.5 percent two times per day for 5 days at least.

Hu et al.⁹ measured the IOP value after 30 minutes and many weeks following the procedure and found no significant difference. single drop of timolol or betaxolol in the aforementioned investigation.

Waseem and Khan²⁷ suggested that Increased intraocular pressure may occur when the cornea is sliced with a YAG laser (IOP). In the study, postoperative antiglaucoma drops were not used. IOP rose somewhat as a consequence of the modest total energy dosage delivered by the laser.

Cevher et al.²⁰ 2017 did not find significant increase, Following the YAG laser capsulotomy, a week of twice-daily brimonidine tartrate medication was required.

Waseem and Khan²⁷ stated that laser capsulotomy enhanced vision and reduced lenticule astigmatism. Changes in AC depth may have an effect on optical errors, intraocular lens placement, and intraocular pressure.

Our study reported that there was no significant difference statistically between pre session and after 1month according to corneal topography k_1 reading with p-value ($p < 0.05$), the value was in pre session (44.29 ± 1.54) compared to value in after 1month (43.79 ± 1.37), with mean difference (-0.50).

Also, there was significant difference statistically between pre session and after 1month according to corneal topography k_2 reading with p-value ($p < 0.05$), The highest value was found in pre session (45.40 ± 1.26) compared to lowest value was found in after 1month (45.18 ± 1.39), with mean difference (-0.22).

Additionally, there was significant difference statistically between pre session and after 1month according to average k reading with p-value ($p < 0.05$). The highest value was found in pre session (44.68 ± 1.24) compared to lowest value was found in after 1month (44.36 ± 1.43), with mean difference (-0.32).

Patients' spherical equivalent values dropped which showed in refraction. After YAG capsulotomy, a month-long follow-up period found no significant change in SE values⁹ however other examinations suggested an increase in hyperopia.²⁸

Karahan et al.²⁹ reported that Tamer's hyperopia increased by 0.16–0.36 D after a YAG laser capsulotomy, depending on the capsulotomy's width. Hyperopia in the patient might have been induced by the

IOL being transferred to the back of the eye during the YAG capsulotomy surgery³⁰ We didnot find statistically significant changes in the Km values, which is in line with earlier findings. The focal point of the laser is clearly too far away from the cornea for this to be the cause.³¹

CONCLUSION

Nd: YAG laser capsulotomy is Golden treatment of PCOs. Which provides a number of benefits over other invasive treatment techniques, Using YAG laser to clears visual axis from opacification so visual functions improved directly after performing the procedure and we found statistically Significant Improvement in the UCVA and BCVA.

The IOP follow up result: was within normal or lower than pre Session and I referred this to the Effect of anti-glaucoma eye drops used for one week.

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