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Original Article

Intraocular Pressure Changes after Nd-Yag Laser Posterior Capsulotomy in a Tertiary Care Hospital of Haryana

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ABSTRACT

Background: Posterior capsular opacification (PCO) is still one of the most common complication following cataract surgery. Although Nd-Yag laser is safe and effective, complications such as rise in intraocular pressure, cystoids macular odema and retinal detachment can occur after Nd-yag laser capsulotomy.

Material and Methods: A retrospective, observational study was conducted to evaluate the changes in the IOP after Nd-Yag laser capsulotomy in 200 eyes over a period of one year in a tertiary care hospital of Haryana. After assessing the visual acuity and posterior capsule opacification (PCO), IOP was measured with Applanation tonometry. Posterior capsulotomy was done with ND Yag laser. Post procedure IOP was measured after 24 hours, 1 week and 1 month.

Results: The mean IOP at baseline before posterior capsulotomy was 13.31 mmHg, then after capsulotomy at 24 hr 17.42 mmHg; 14.27 mmHg at 1 week and 13.40 mmHg at 1 month. There was a statistically significant (p=0.001) p value. We divided the patients into two groups according to energy level used in group one <2 millijoule and in group two energy level 2-4 millijoule, similarly we divided the patients into two groups according to no. of shots , in one group shots between 5-15 in another group 15-26 shots. We find a correlation between the increase in IOP with the energy level used and no. of shots, as p value was found statistically significant. We found that in about 7 patients PCO was thick and no of shots and energy level was used more and after the procedure IOP was raised even after 1 week, so along with timolol maleate 0.5%, latanoprost 0.005% was also given to these patients to lower the IOP.

Conclusion: Nd-Yag laser is still the gold standard treatment for posterior capsular opacification (PCO). There is a transient rise of IOP after the Nd-Yag laser capsulotomy mainly in 24 hrs and within 7 days but it comes to normal limits within 1 month. The rise of IOP depend upon the energy level and no of shots used during capsulotomy. The rise of IOP can be controlled with antiglaucoma drugs.

Key Words: *Posterior capsular opacification (PCO), Neodymium-Yttrium Aluminum- Garnet Laser posterior capsulotomy (Nd-Yag LPC), Intraocular pressure (IOP)*

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INTRODUCTION

In 1980s we saw the first description of neodymium-doped yttrium aluminum garnet (Nd: YAG) laser capsulotomy [1]. The multiplication of surviving epithelial cells [2, 3] and their migration to the region between the posterior capsule and the intraocular lens (IOL) cause posterior capsular opacification to occur [4, 5].

A common post-cataract surgery consequence is posterior capsular opacification (PCO). The current standard of care for posterior capsular opacification (PCO) is Nd-YAG laser posterior capsulotomy. Nd-YAG has a greater than 95% success rate [6, 7].

Reduced visual acuity, poor contrast sensitivity, monocular diplopia, and glare are common consequences of posterior capsular opacification that frequently require therapy [8, 9 & 10].

Although Nd-YAG is safe and effective, problems after Nd-YAG laser capsulotomy can include an increase in intraocular pressure [11, 12], cystoids macular odema [13], and retinal detachment [14, 15 & 16]. The capsulotomy is performed by series of puntures in cruciate pattern with first puncture aimed at visual axis. Typically, a 3 mm hole is sufficient, while bigger ones could be required for treating and visualizing peripheral retinal detachment [17].

The trabecular meshwork becomes deposited with debris after Nd-YAG laser capsulotomy, which causes trabeculitis as a result of radiating "shock waves" from neurovascular mechanisms, papillary block, and inflammatory swelling of the ciliary body or iris root linked to angle closure [8].

The most significant side effect of Nd-YAG laser posterior capsulotomy is a small increase in intraocular pressure. In healthy eyes, there is a slight increase in intraocular pressure that often goes away within 24 hours, especially in individuals taking glaucoma medications both before and after laser treatment. Patients with pre-existing glaucoma experience intraocular pressure rise more frequently and for a longer period of time. So, following a Nd-YAG laser posterior capsulotomy, glaucomatous patients need to continue their glaucoma treatment for a few weeks [18].

Nd-YAG is preferred since it is non-invasive and cannot cause infection [19]. The purpose of this study is to evaluate the changes in intraocular pressure at baseline, 24 hr, 1 week and at one month after Nd-YAG laser posterior capsulotomy.

MATERIALS AND METHODS

A retrospective, observational study was conducted to evaluate the changes in the IOP after Nd-YAG laser capsulotomy in 200 eyes with significant posterior capsular opacification (PCO) after uncomplicated cataract surgery with intraocular lens (IOL) implantation in the Department of Ophthalmology of N.C Medical College and Hospital Israna (Panipat).

The study was conducted over a period of one year from 1st may 2022 to 30th april 2023.

INCLUSION CRITERIA

1) Patient more than 40 yr
2) No history of intraocular surgery in both eyes other than cataract surgery
3) Clear cornea
4) The patients with posterior chamber IOL only

EXCLUSION CRITERIA

1. Patients less than 40 yr
2. Patients who refused to participate in the study
3. Patients with co-existing ocular diseases like uveitis, glaucoma, ocular injury

After obtaining informed consent comprehensive ophthalmic examination was performed on all patients before the procedure. It included best-corrected visual acuity (BCVA), refraction, slit lamp and IOP measurement. IOP was measured by Goldmann applanation tonometer with topical anaesthesia proparacaine 0.5% eye drop and fluoresce in strips.

The procedure was explained to the patient about the aim of the procedure, time requirement, level of pain, requirement for a solid state fixation.

The patients were divided into two groups. In group one total 138 patients were there, receiving energy level <2 millijoule and in group two total patients were 62, receiving energy level >2 millijoule.

Depending upon the number of shots patients were divided into two groups, in group one 169 patients were there and number of shots was between 5-15. In group two 31 patients were there receiving number of shots between 15-26. Prior to the procedure 1% tropicamide and 2.5% phenylephrine were administered for pupil dilation.

Procedure-

The procedure was done in dark or semi-dark room.
In a reassuring way the patient was introduced to the equipment.
The chair was adjusted according to the patient, so that head can be gently placed in front of the laser on chin rest.
The slit lamp focused and Nd-yag laser machine was switched on.
By other eye the patient was instructed to fix to the fixation light.

The procedure for capsulotomy was performed by single surgeon with the same technique. A 3 to 4 mm wide central capsulotomy was performed by focusing power at the posterior capsule level after dilation. The energy level of Nd-YAG laser begins at 1.5 millijoules and increased upto 3.4 millijoule and firing shots between 5-26 depending upon the thickness of posterior capsular opacification (PCO). The IOP was measured by Goldmann applanation tonometer after the procedure at 24 hr, on 7th day and at 1 month.

After the procedure all patients were given topical beta- blocker timolol maleate 0.5 % eye drop twice a day, prednisolone 1% four times a day, moxifloxacin 0.5% 6 times a day, nephafenac two times for 1 week.

FOLLOW-UP

All patients after the procedure were called for follow-up at 24 hr, 7th day and at one month. It includes ophthalmic examination including BCVA, slit lamp, refraction and IOP measurements.

RESULTS

A total of 200 eyes of 200 patients were included in the study in which 107 men and 93 were women. Out of 200, 57.5% were operated by phacoemulsification and 42.5% operated by SICS. All patients in the study were pseudophakic. The average time between cataract surgery and Nd-YAG with extremes of 3 months to 5 yrs.

Table 1- shows the comparison of IOP changes with the time in which mean IOP at the baseline was 13.31 mmHg, IOP at 24 hr was 17.42 mmHg, on 7th day 14.27 mmHg and at 1 month it reaches at 13.40 mmHg .

The differences observed between the IOP before the Nd-yag laser capsulotomy and the IOP at 24 hr and on 7th day after capsulotomy are statistically significant (p <0.0001), but the difference between the IOP before the capsulotomy and the IOP at 1 month is stastistically insignificant (p=0.45).

	Mean	Median	SD	Minimum	Maximum	P value
IOP baseline	13.31	14	1.213	10	16	
IOP 24 hr	17.42	18	1.955	14	28	0.001 (s)
7th day	14.27	14	1.384	12	22	0.001 (s)
1 month	13.40	14	1.457	14	16	0.45

We observed that there is a rise of IOP after Nd-yag laser capsulotomy which gradually decreases from 24 hrs to 7 days to Stabilizes at 1 month.

RESULT 1: COMPARSION OF IOP CHANGES WITH TIME

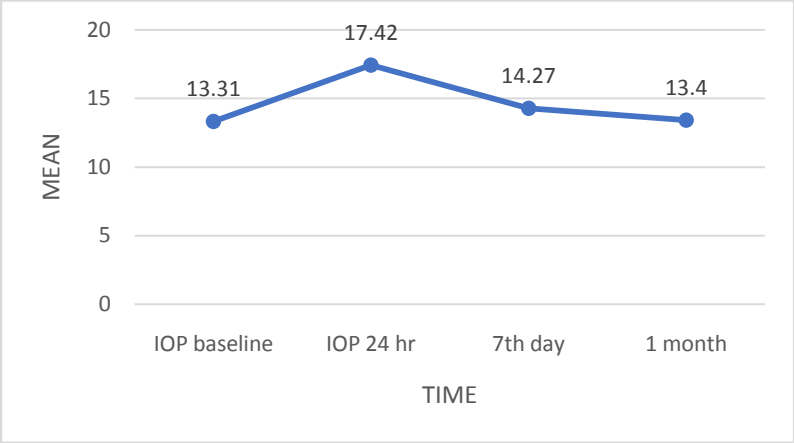


Table 2- shows the comparison of IOP changes with the energy level used. We divided the the patients into two groups. In group 1 energy level used was <2 mj and in group 2 was between 2-4 mj. Mean IOP in group 1 at baseline was 13.19 mmHg and in group 2 was 13.58 mmHg, at 24 hr in group 1 17.04 mmHg and in group 2 18.24 mmHg, at 7th day in group 1 14.10 mmHg and in group 2 14.65 mmHg, and at 1 month in group 1 13.30 mmHg in group 2 13.65 mmHg.

The above result shows that the IOP changes the with the amount of enegy used in both groups in which p value at baseline (p value=0.03), at 24 hr (p value=0.001), on 7th day (p value=0.01), and at 1 month (p value=0.18) which came out to be stastistically significant, shows that there is a correlation between IOP changes and the energy level used after Nd-yag laser capsulotomy.

RESULT-2 COMPARSION OF IOP WITH ENERGY LEVEL USED

	Energy	No of patients	Mean IOP	SD	P value
Baseline	<2	138	13.19	1.150	0.03(s)
	2-4	62	13.58	1.313	

24 hr	<2	138	17.04	1.306	0.001(s)
	2-4	62	18.24	2.762	
7th day	<2	138	14.10	1.167	0.01(s)
	2-4	62	14.65	1.728	
1 month	<2	138	13.30	1.462	0.18
	2-4	62	13.65	1.427	

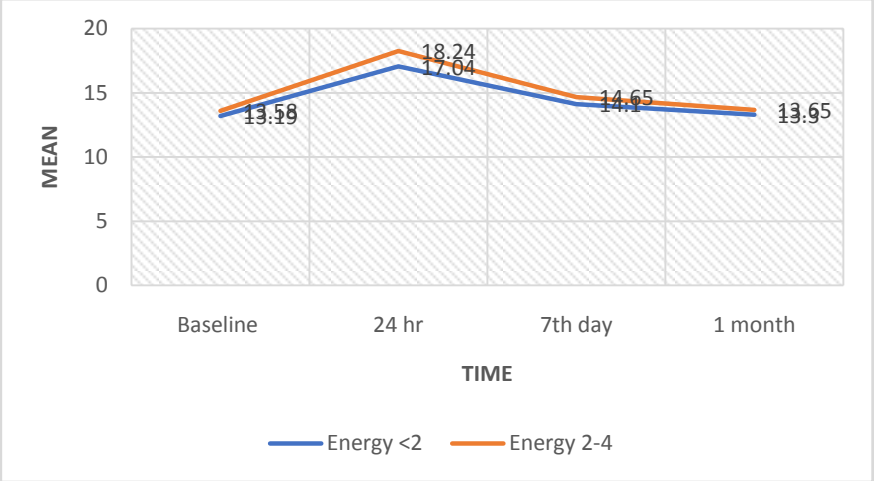
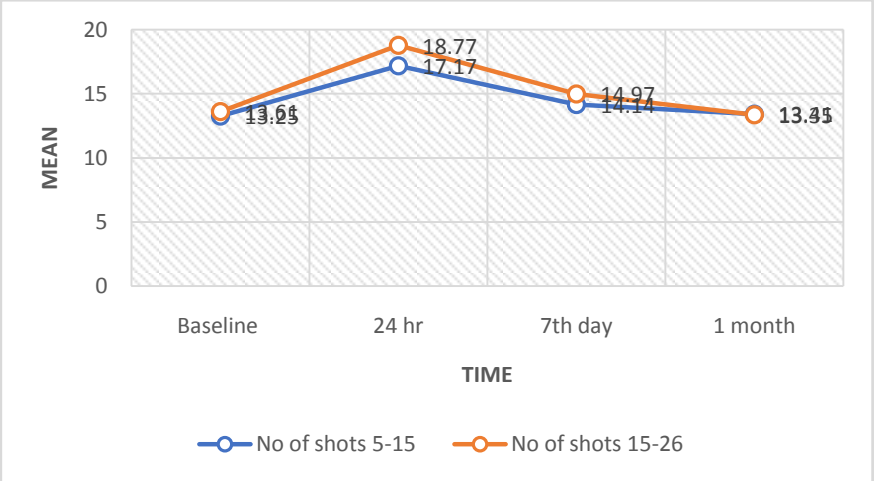


Table 3- shows the comparison of IOP changes with the number of shots. We divided the patients into two groups. In group 1 no of shots used was between 5-15 and in group 2 was between 15-26. Mean IOP at baseline in group 1 was 13.25 mmHg, in group 2 13.61 mmHg, at 24 hr was in group one 17.17 mmHg, in group 2 18.77 mmHg, similiarly on 7th day in group 1 14.14 mmHg, in group 2 was 14.97, and at 1 month in group 1 13.41 mmHg and in group 2 was 13.35 mmHg.

The above results shows the IOP changes with the number of shots used used in both groups in which p value at baseline was 0.31, at 24 hr (p value=0.001), on 7th day (p value=0.002) which came out to be statistically significant , shows that there is correlation between IOP changes after Nd-yag laser capsulotomy and the number of shots.

RESULT- 3 COMPARSION OF IOP WITH NUMBER OF SHOTS

	No of shots	No of patients	Mean IOP	SD	P value
Baseline	5-15	169	13.25	1.230	0.31
	15-26	31	13.61	1.086	
24 hr	5-15	169	17.17	1.326	0.001(s)
	15-26	31	18.77	3.640	
7th day	5-15	169	14.14	1.187	0.002(s)
	15-26	31	14.97	2.057	
1 month	5-15	169	13.41	1.502	0.83
	15-26	31	13.35	1.199	



DISCUSSION

Posterior capsular opacification (PCO) is the still most common complication following cataract surgery .There are different types of posterior capsular opacification (PCO) as discussed below-

1) **Primary opacification**- In this there is soft, clear cortex which sticks to posterior capsule. because some of the cortex is partially absorbed by the aqueous and some becomes adhere to the posterior capsule [20].
2) **Fibrous membrane-** it is formed by the aggregation of the lens epithelial cells between the apposition between anterior capsule remnant and the posterior capsule, which can extend towards the visual axis. The posterior capsule with thick fibrous opacities require more power and shots to open the capsule [21].
3) **Elschnig'pearls-** it is formed by proliferation of lens epithelium on the posterior capsule giving the posterior capsule a fish egg appearance at the site of opposition between remnants of the anterior capsule and posterior capsule. The proliferating epithelium may produce multiple layers which leads to formation of frank opacification [22]. The Elschnig pearls are related to the patient age and most frequently seen type of opacification. These pearls are best seen by retroillumination [20].

The decision for consideration of capsular opacity is significant require three factors-

- **First-**the slit lamp appearance of opacification
- **Second-** the fall of visual acuity (VA) of 2 lines or more with the Snellen's chart.
- **Third –**the clinical assessment of the visual potential by evaluating the appearance of the macula [21].
  The choice of treatment for posterior capsular opacification is the Nd-yag laser which is still the gold standard [6, 7].
- **Nd-Yag laser-** it is a solid state laser source which emits an infra-red light having wavelength 1064 nm invisible to the eyes. In a pulsed mode Nd-yag laser deliver a significant amount of energy in a very short time at a given point. It is useful for cutting or perforating at a very precise point, while preventing the neighbouring tissues [20].

In our study 200 eyes are taken in which 107 men and 93 women. Out of 200 patients 57.5 % were operated by phacoemsulfication and 42.5% were operated by Small Incision Cataract Surgery (SICS). Prior to the procedure intraocular pressure was taken by Goldmann applanation tonometer (GAT). Before the Nd-yag laser pupil was dilated and 3 to 4 mm wide central capsulotomy was performed by Nd-yag laser.

There is a rise of the intra ocular pressure after Nd- yag laser which can be controlled with antigalucoma drugs [18]. In our study, we have not included the patients with glaucoma.

In the study of 2000 done by Jayne Ge et al 100 patients were included, in which 37 patients had glaucoma. In about 17% of the patients after the capsulotomy required an initiation or additional pressure lowering medications. Glaucoma patients require an initial or additional glaucoma medications for long term control of IOP than non-glaucomatous patients (p value=0.002) [23].

In a study of singhal et al of total 60 eyes were included in the study and divided into two groups. In group 1 subjects were included in which 0.2%brimonidine was instilled and in group 2 treated with 0.3% ciprofloxacin. In both groups Yag-laser was done and the power setting was between 2 to 3 millijoule and number of shots between 2 to 4 depending upon the thickness of PCO. After the procedure IOP was recorded in both groups and the results showed that IOP was reduced in group 1 in which 0.2% brimonidine was used [24].

According to Subrahmanyaswara Rao et al study after the procedure there is a significant rise of the intraocular pressure , so these patients were put on topical timolol 0.5 % drops 1 hour before and after the procedure for capsulotomy. In some patients who showed the uncontrolled IOP with the timolol alone, oral acetazolamide was added [25].

Saley Hamidou Idrissa; et al. studied on 32 eyes and found that there was a significant rise of IOP at 1 day and 7 days, and there is no significant rise of IOP at 1 month. In their study the IOP was raised more than 22 mmHg in 2 patients after the procedure because in these patients before the capsulotomy IOP was greater than 18 mmHg, so they required beta blockers to control the IOP. They also studied that laser intensity and number of laser pulses is not a factor affecting the IOP after capsulotomy [19].

Similarly in a study of 2019 Sirakaya et al of 35 patients there is a significant rise of IOP at 1 day and 7 days but none of the patients were given antiglaucoma drugs because there was a mild increase in the IOP due low cumulative dose of laser energy used during the procedure [26].

But in a study of 2015 of Ozatas et al of 30 pseudophakic eyes in which there was no significant changes in the mean IOP at one week and at 1 month [1]. Shani et al. did not find any elevation of IOP after Nd-yag and stated that healthy pseudophakic eyes generally do not have any rise of IOP after Nd-yag laser capsulotomy [27].

In our study there was a statistically significant rise of IOP after the procedure within 24 hrs and 7 days which comes to normal limits within 1 month. In about 7 patients posterior capsular opacification (PCO) was thick and number of shots given were also more than 20, maximum increased upto 26 shots .The energy level was also increased maximum upto 3.4 millijoule. The intraocular pressure was measured in next 24 hrs, in others patients intraocular pressure was increased but less than 20 mmHg. After the procedure all patients were given antiglaucoma drug timolol maleate 0.5 %. In about 7 patients intraocular pressure increased upto 26 mmHg after the procedure and IOP was also high on second visit on 7th day, so these patients along with timolol maleate 0.5 %, latanoprost 0.005% were given to control the IOP. The IOP was rise because the enegy level and no of shots were more due to thick posterior capsular opacification (PCO).

In our study there was 200 eyes of 200 patients and we divided it into two groups in which the energy level used <2 millijoule in one group and in other group energy used >2 millijoule. In group 1 patients receiving energy level <2 millijoule were 168 and 62 patients in group 2 receiving energy >2 millijoule. There was a rise of IOP at 24 hr and on 7 days, in which the p value came out to be significant. The rise in IOP is more in patient in which more enegy level was used.

Waseem et al. in divided the patients in two groups. In group 1 low energy was used and in second group more energy was used. The IOP was raised more in group in which more energy (p value <0.001) was used during capsulotomy [28]. In the kumar et al study increase in IOP was related to the level of energy used during capsulotomy, as the patients who require energy more than 130 millijoule as compared to who require energy level less than 130 millijoule [29].

According to Hashim Thiab Hassan study 2020 of 100 patients the effect of energy level was not found significant (p value >0.2) with the rise of IOP. The number of laser pulses used in aphakic group was 25.2 and 26.8 pulses in pseudophakic group and the mean number of pulses of both group was 26. The effect of laser pulses on the rise of IOP at 1 hr was not significant (pvalue>0.4) and no of laser pulses is not related to the elevation of IOP [18].

In Niharika et al study 35 patients were included and there was significant correlation of the IOP for the no of shots in which number of shots were more than 20. The level of energy used was less than 20 millijoule and the p value was not statistically significant, no correlation of IOP with the energy level used during capsulotomy [30].

In a study of shams et al study of 2021 of 50 patients found that in all patients IOP was recorded 2 hour after the procedure and then at one week. They found that IOP was raised in all patients after the procedure irrespective of the number of shots [31].

But in our study the patients were divided into two groups in which the no of shots in one group between 5-15 and in other group between 15-26. The p value cames out to be statistically significant. There was a rise of IOP in 24 hr and on 7th day in the group in which number of shots was more and the IOP came out to be in normal limits within one month.

CONCLUSION

The most common complication after cataract surgery is the posterior capsular opacification and Nd-yag laser is still the gold standard treatment for posterior capsular opacification (PCO) .There is a transient rise of IOP after Nd-yag laser capsulotomy mainly in 24 hrs and within 7 days but comes to normal limits within 1 month. The main cause of rise of IOP depends upon the energy level used and the number of shots given during capsulotomy. After Nd-yag laser the rise of IOP can be controlled with antiglaucoma drugs.

REFERENCES

1. Oztas Z, Palamar M, Afrashi F, Yagci A. (2015). The effect of Nd-YAG Laser capsulotomy on anterior segment parameters in patients with posterior capsular opacification. Clin Exp Optom. 98:167-171.
2. Akmaz B, Cakir A, Bayat AH, Karadas. (2018). The effect of posterior capsulotomy size on refraction and anterior chamber parameters following Nd:YAG laser treatment. Medicine Science. 7(3):571-4.
3. Apple DJ, Solomon KD, Tetz MR, et al. (1992). Posterior capsule opacification. Surv Ophthalmol. 37:73-116.
4. Simek A. (2017). Biometric and intraocular pressure changes after ND: YAG laser capsulotomy. *Eur Res J*. 3(2):140-144.
5. Cetinkaya S, Cetinkaya YF, Yener HI, Dadaci Z, Ozcimen M, Acir NO. (2015). The influence of size and shape of ND:YAG capsulotomy on visual acuity and refraction. Arq Bras Oftalmol. 78:220-3.
6. Praveen kumar G S, Lavanya P, Raviprakash D. (2021). Effects of Nd: YAG laser capsulotomy in posterior capsular opacification. *Med Pulse International Journal of Ophthalmology*. 17(2):10-12.
7. Pandey SK, Apple DJ, Werner L, Maloof AJ, Milverton EJ. (2004). Posterior capsule opacification: a review of the aetiopathogensis, experimental and clinical studies and factors for prevention. *Indian J Ophthalmol*. 52(2):99-112
8. Parajuli A, Joshi P, Prabha S, Pradhan C. (2019). Effect of Nd-YAG laser posterior capsulotomy on intraocular pressure, refraction, anterior chamber depth, and macular thickness. *Clin Ophthalmol*. 13:945-952.

9. Claesson M, Klaren L, Beckman C, Sjostrand J. (1994). Glare and contrast sensitivity before and after ND: YAG laser capsulotomy. *Acta Ophthalmol*. 72(1):27-32.
10. Sunderraj P, Villada JR, Joyce PW, Watson A. (1992). Glare testing in pseudophakes with posterior capsule opacification. Eye. 6(4):411.
11. M.M. Channell and H. Beckman, (1984). "Intraocular pressure changes after neodymium-YAG laser posterior capsulotomy". Archives of Ophthalmology. 102(7):1024-1026.
12. W. J. Stark, D. Worthen, J.T. Holladay, and G. Murray, (1985) "Neodymium: YAG lasers: an FDA report", Ophthalmology. 92(2):209-212.
13. R. F. Steinert, C. A. Puliafito, S.R. Kumar, S.D. Dudak, and S. Patel, (1991). "Cystoid macular edema, retinal detachment, and glaucoma after Nd-YAG laser posterior capsulotomy". The American Journal of Ophthalmology. 112(4):373-380.
14. S.R. Leff, J.C. Welch, and W. Tasman, (1987). "Rhegmatogenous retinal detachment after YAG laser posterior capsulotomy". Ophthalmology. 94(10):1222-1225.
15. Mac Ewen CJ, Dutton GN. (1986). Neodymium-YAG Laser in the management of posterior capsular opacification: complications and current trends. Trans Ophthalmol Soc UK. 105:337-44.
16. HU CY Woung LC, Wang MC. (2001). Change in the area of laser posterior capsulotomy: 3 month follow-up. *J Cataract Refract Surg*. 27:537-42.
17. Gore VS. (2012). The study of complications of Nd-YAG laser capsulotomy. *Int J Bioinform Res*. 4:265-8.
18. Hassan HT. (2020). Changes in intraocular pressure after Nd-YAG laser Posterior capsulotomy. *Clin Ophthalmol J*. 1(2):1006.
19. Idrissa SH, Ahmed B, Fouad C, Meriem A and Andaloussi BI. (2021). Intraocular Pressure changes after posterior Nd-YAG Capsulotomy. Acta Scientific Ophthalmology. 4(11):02-06.
20. Jack J Kanski. (1995). "clinical ophthalmology. A systemic approach". Third edition. :304-305.
21. Ian J Constable. (1990). "Arther Siew Ming Lim. Laser its clinical uses in eyes diseases". Second edition. :166-170.
22. Stephen JH Miller. (1984). "Parson Diseases of the eye seventeenth edition". 179.
23. Ge J, Wand M, Chiang R et al. (2000). Long term effect of Nd-yag LPC on IOP. Archives of ophthalmology. 118:1334-1337.
24. Singhal D, Desai R, Desai S, Shastri M and Saxena D. (2011). Use of topical brimonidine to prevent intraocular pressure elevations following Nd-yag laser posterior capsulotomy. *Journal of pharmacology and pharmacotherapeutics*. 2(2):104-106.
25. Rao CMS, Satyasrinivas V, Muralikrishna V, AnuhyaY, Barua K. (2017). Clinical study of visual outcome and intraocular pressure changes following Neodymium-doped Yttrium Aluminum Garnet Laser Capsulotomy in post-operative cataract patients with posterior capsule opacification. *International Journal of Scientific Study*. 5:76-82.
26. Sirakaya E, Agadayi A, kucuk B, Hepokur M. (2019). Effect of YAG Laser capsulotomy on refraction and anterior segment parameters in patients with posterior capsular opacification. *Erciyes Med J*. 41(3):316-20.
27. L.Shani , R. David, Z. Tessler, S. Rosen, M.Schneck, and Y. Yassur. (1994). Intraocular pressure after neodymium: YAG laser treatments in the anterior segment. *Journal of cataract and refractive surgery*. 20(4):455-458).
28. Waseem M, Khan HA. (2010). Association of raised intraocular pressure and its correlation to the energy used with raised versus normal intraocular pressure following Nd-YAG laser posterior capsulotomy in pseudophakes. *J Coll Physicians Surg Pak*. 20(8):524-7.
29. Kumar J, Vijay P, Preeti C et al. (2017). Role of Nd-yag laser in the management of posterior capsular opacification. *IOSR Journal of Dental and Medical Sciences*. 16(12):14-20.
30. Shetty NK and Sridhar S. (2016). "Study of variation in intraocular pressure spike (IOP) following Nd-yag laser capsulotomy". *Journal of clinical and diagnostic research*. 10(12):9-12.
31. Shams A, Das N, Kumar J, Khan B, Bhatti MN et al. (2021). Study of intraocular pressure after Nd-yag laser capsulotomy. Annals ASH KMDC. 26(4):198.