

Study of rise of IOP and visual acuity after ND YAG laser capsulotomy in patients with posterior capsular opacification

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Abstract

Aims: To assess the

1. rise of IOP without use of pre procedure and post procedure anti glaucoma medication
2. and to note the improvement in visual acuity.
3. to observe other complications.

Materials and Method: This study comprise of total 100 eyes of 98 patients who had Nd-YAG laser capsulotomy. Visual acuity and ocular pressure were recorded before procedure using Snellen's chart and applanation tonometry respectively.

Capsulotomies were done using Nidek YAG laser system. Post-operative vision was recorded after 24 hrs. Post operative IOP was recorded at 4th hr, and 24hr.

None of the patients were treated with IOP lowering medication.

Results: Total 100 eyes of 98 patients with mean age between 40-76 yrs (53 males & 45 females) were studied. The improvement of visual acuity was excellent with > 90% of patients with > 2 lines of Snellen's chart after 24 hrs.

Max rise of IOP occurred with in first 4 hrs of post op period mean IOP decreased steadily and reached based line by 24 hrs.

Conclusion: Although the improvement in visual acuity is excellent after Nd-YAG laser capsulotomy certainly there is rise of IOP during early post op period max in 4 hrs. This deviation of IOP appears to be self limited.

Materials and Methods

The current study comprised of a total of 100 eyes of 98 patients, of Nd:YAG laser in the treatment of posterior capsular opacification after cataract surgery, who attended the ophthalmology outpatient department.

Selection criteria: inclusion criteria: All patients with postoperative posterior capsular opacification with vision < 6/9.

Exclusion Criteria:

- a. Posterior Capsular Opacification (PCO) associated with corneal scars, irregularities, or edema that interferes with target visualization.
- b. PCO associated with active intraocular inflammation,
- c. PCO associated with cystoid macular edema or other complications that is likely to reduce visual acuity,
- d. An uncooperative patient who is unable to remain still or hold fixation during the procedure, with threat of inadvertent damage to intraocular structures nearby.
- e. Glaucoma patient were excluded.

Sample Size: As the prevalence rate of posterior capsular opacification after one year of cataract surgery is 33% and permissible error of 10%, size of the sample works out to be 98 patients(100eyes) cases (according to $4pq/12$ where p =prevalence and $q=100-p$ and l =permissible error). Eligible and indicated cases per year work out to be 300 cases. Every third case was considered for the study by systematic random sampling during the period of 01-12-2013 to 01-12-2015. All patients with PCO were subjected to YAG laser capsulotomy.

Data Collection: Name, Age, Sex and Address of all the patients were collected. Local examination was done as follows:

- a. Visual acuity - BCVA was noted from Snellen's chart or Landordt's broken ring depending upon cases.
- b. Slit lamp examination
 1. Diffuse examination,
 2. Oblique and slit illumination,
 3. Retroillumination.

On the slit lamp, apart from the other features of anterior segment, PC opacity was noted and was graded into 3 groups.

- c. Direct Ophthalmoscopy: was done and PCO was graded into 3 groups based on clarity of visualization of posterior segment.
- d. Mild topical NSAID and cystamic NSAID were given to the patient after the procedure.

Results and Observations

In our present study of 98 patients with PCO, all the 100 eyes were subjected to Nd -YAG laser posterior capsulotomy.

The results of study are as follows:

Sex distribution of patients: A total of 98 patients were treated, of which 53 were male and 45 were female. Majority of the people were from a low socioeconomic background.

Age distribution of patients: The age incidence of patients was as follows. The youngest age among the female patients was 26 years and oldest was 76 yrs. Similarly in male patients, youngest male was 18 yrs, and oldest was 76 yrs. Maximum no. of patients

affected were in the age group between 51-70 yrs. Their number was 65. They constituted more than 50 % of total cases.

Eye distribution of patients: A total of 98 patients were treated of which 2 patients had bilateral PCO. Out of the 100 eyes that were studied, 48 were Right eyes and 52 were Left eye.

Most of the capsulotomies were done at the level of energy between 1.6 mj to 2.4 mj. It consisted of 63 eyes. 18 capsulotomies were done at level of 1.2 mj to 1.5 mj, while 19 capsulotomies were done at the level of 2.5 mj to 3.1 mj. The minimum amount of energy used was 1.2 mj and maximum amount of energy used was 3.1 mj.

Distribution of best corrected visual acuity; the preoperative BCVA was mostly within the range of counting fingers to 6/24. The no. in that group was 70.

Only 7 had a BCVA of appreciating only hand movements.

Of the patients who had relatively better vision in the whole group, only 10 had BCVA of 6/12 and 13 had BCVA of 6/18.

Postoperatively, 57 patients had BCVA of 6/9 and 6/6. The no. of patients with BCVA of 6/12 was 20. 4 patients had BCVA of 6/24 and 11 patients had BCVA of 6/18. Only 8 had BCVA \leq 6/36. Among these patients 4 had high postoperative astigmatism. 3 patients developed iritis, later on with treatment they had good vision. 1 patient developed cystoid macular edema, with treatment his vision improved.

Table 1: Distribution of improvement of vision in Snellen's chart

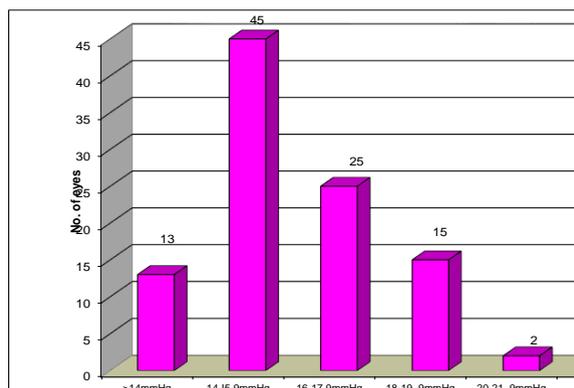
Improvement	No. of patients	Percentage
≥ 3 lines	60	60%
> 2 lines	32	32%
>1 line	8	8%
No improvement	0	0
Decrease	0	0
Total	100	100%

Improvement of 3 lines or more was seen in 60 patients, 32 patients had an improvement of 2 lines and 8 patients had an improvement of 1 line.

Distribution of pre operative intraocular pressure: 73 eyes were in the range of 14 mm Hg to 18 mm Hg, and 14 were above 18 mm Hg. 13 eyes had IOP less than 14 mm Hg preoperatively. The minimum IOP found in the group was 10.2mm Hg and maximum of 20.6mm Hg.

Distribution of post operative intraocular pressure at 4HRS: Distribution of postoperative intraocular pressure after 4hrs: 69 eyes were in the range of 14-18mm and 19 patients had intraocular pressure between 18-20mmHg and 2 patients had intraocular

pressure more than 22mmHg. These patients were known case of glaucoma.



Distribution of postoperative intraocular pressure after 24hrs: 72 eyes had intraocular pressure around 14-18mmHg, 12 eyes had pressure less than 14mmHg, 14eyes had intraocular pressure between 18-20mmHg, 2 patients had intraocular pressure more than 20mmHg, these were known case of glaucoma and were prescribed topical beta blocker (timolol) along with oral carbonic anhydrase inhibitors for 1 week. Their pressure returned to normal within 1 week.

Distribution of complications: The patients were followed up for a period of 6months. Out of 100 eyes treated, 2 patients had acute rise of intraocular pressure. Both the patients were known case of glaucoma and with antiglaucoma medications their pressures returned to base line.

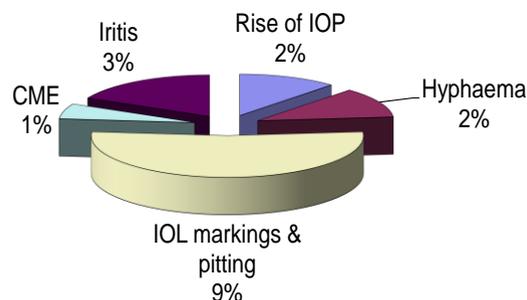
2 patients developed hyphaema which resolved subsequently without causing any damage to eye.

IOL pitting was observed in 9 eyes. This pitting was not visually significant and did not produce any glare or image degradation.

3 patients developed iritis, which was treated with topical steroids and cyclopegics. Iritis resolved subsequently without causing any significant long term reduction of vision.

Rupture of anterior hyaloid face was observed in 2 eyes.

1 patient developed CME, with treatment it resolved without any deteriorating effect on vision.



Discussion

PCO is one of the common complication following cataract extraction with intact posterior capsule.

Postoperative opacification of initially clear posterior capsule occurs frequently in patients after any type of extra capsular cataract extraction. The patient complains of symptoms such as blurred vision, visual distortion and glare resulting in inability to carryout activities of daily living due to decreased visual acuity or an increase in glare.

Nd:YAG laser capsulotomy is non invasive, effective and it is done as an OPD procedure.

The current study of 100 eyes of Nd:YAG laser in the treatment of PCO after cataract surgery was done in department of ophthalmology.

The youngest age being 26 years in female and 18 years in males and oldest being 76 years in female and 76 years in male.

The laterality in our study was left side in 52 eyes and right side in 48 eyes.

Table 2: On comparing with the other studies the improvement in visual acuity is shown as follows

Improvement	Greenidge et al ⁽⁴⁾	Skolnick et al ⁽⁵⁾	Terry AC et al ⁽⁶⁾	Michael J Flohr et al ⁽⁷⁾	Present study
> 3 lines	83%	45.3%	67%	57%	60%
2 lines		20.3%			32%
1 line	9%	24.1%	25%	39%	8%
No improvement	0	9%		4%	0
Decrease in vision 1	3.5%	1.4%			0

From the above data it may be summarized that more than 70% of eyes had an improvement of visual acuity of more than 2 lines after Nd-YAG laser capsulotomy. Our improvement in vision was better than what Skolnick RA et al reported and little less than what Terry AC et al reported. Michael G Flohr et al had a finding similar to what we found in our present study.

Greenidge KC had a finding which can be compared to with our findings. Overall the above table suggests that our study findings are comparable with other studies and visual outcome in all studies are good.

Table 3: On comparing with other studies the complications of YAG laser capsulotomy are as follows

Complications	Juhits et al ⁽¹⁾	Kcates et al ⁽²⁾	Pop et al ⁽³⁾	Present study
Transient rise of intraocular pressure	1.4%	3.6%	14.73%	3%
Damage to intraocular lenses	40.3%	-	8.77%	9%
Moderate iritis	-	-	1%	3%
Disruption of anterior hyaloid face	3.8%	-	-	2%
Cystoid macular edema	-	2.3%	-	1%
Retinal detachment	-	0.4%	-	-

From the above data that the common complications associated with Nd:YAG laser capsulotomy are temporary rise of intraocular pressure and pitting of intra ocular lens.

The risk of damage to intraocular lenses in our study was significantly lesser than that reported by Juhas et al. Pop et al had a finding similar to our present study.

The incidence of moderate iritis and disruption of anterior hyaloid face in our study was comparable with other studies.

Conclusion

Our study has revealed that

1. There is no significant rise of ocular pressure at the end of 4 hrs and 24 hrs & 1 wk after Nd-YAG capsulotomy.

2. 60% of patients has visual improvement of ≥ 3 lines Snellen's acuity following Nd-YAG capsulotomy.

3. IOL pitting was the major complication following capsulotomy.

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