

Visual outcome and complications following Nd- YAG laser capsulotomy in Posterior Capsular Opacification

Arvind R¹, Nallamasa Rohit Goud², Ch Jagan Mohan Rao³

¹Associate Professor, ²Postgraduate Student, ³Senior Resident, Department of Ophthalmology, Prathima Institute of Medical Sciences, Nagunur, Karimnagar, Telangana, India.

Address for correspondence: Dr Arvind R, Associate Professor, Department of Ophthalmology, Prathima Institute of Medical Sciences, Nagunur, Karimnagar, Telangana, India.

Email: arvind_kmc@yahoo.co.in

ABSTRACT

Objective:

To study the visual outcome and complications following Nd- YAG laser capsulotomy in posterior capsular opacification.

Materials and Methods:

A hospital based prospective study was done on 100 eyes of 100 patients with posterior capsular opacification. Patients above 40 years of age with history of cataract surgery and complaining of defective vision were included in the study. Detailed eye examination was done and patients diagnosed with posterior capsular opacification underwent Nd- YAG laser capsulotomy. Best corrected visual acuity, intraocular pressure and complications if any was noted.

Results: Study included 100 patients with posterior capsular opacification who underwent Nd YAG laser capsulotomy, 61 were females and 39 males. 69% of posterior capsular opacification was in the age group of 51-70 years. 66% of patients developed PCO between 12 to 36 months after cataract surgery. Elschnig's pearl was the most common type of posterior capsular opacification with 82%. 88% of patients visual acuity improved to 6/18 and better to 6/6 following Nd-YAG laser capsulotomy. 15% of patients developed minor complications like IOL pitting, transient rise of IOP and cystoid macular oedema.

Conclusion: Nd- YAG laser capsulotomy is the widely practiced procedure for the management of Posterior capsular opacification. It is a non invasive, relatively safe technique and can be performed as an outpatient procedure.

Keywords: Posterior capsular opacification (PCO), Nd-YAG laser capsulotomy, Elschnig's pearl, Best corrected visual acuity (BCVA), Intraocular pressure (IOP).

INTRODUCTION

Cataract is the most common cause of curable blindness worldwide. In India it has been estimated that the incidence of cataract to be 3.8 million and about 1.8 million cataract surgeries are performed every year¹. Extra capsular cataract

extraction with posterior chamber intraocular lens implantation is the universally accepted surgery for cataract.

Posterior capsular opacification is the most common late post operative complication of cataract surgery. Symptoms of posterior capsular opacification include decreased vision, glare etc.² Types of Posterior capsular opacification are Elschnig's pearl, soemerring's ring, capsular wrinkling and fibrous membranes. Frequency of Posterior capsular opacification ranges from 8.7% to 33.4%.^{3,4} Neodymium-doped yttrium aluminum garnet (Nd:YAG) laser capsulotomy is a relatively noninvasive procedure that is used in the treatment of posterior capsular opacification (PCO).

Nd:YAG laser for posterior capsulotomy has gradually replaced the surgical capsulotomy as it is performed an outpatient procedure⁵. Capsular opening created with Nd:YAG laser tends to increase in size with smoothing of edges and may become circular^{6,7}.

MATERIALS & METHODS

A hospital based prospective study was performed on 100 eyes of 100 patients with posterior capsular opacification, who attended the OPD of Ophthalmology department, Prathima Institute of Medical Sciences, Karimnagar. The study duration was from January 2013 to September 2014.

100 patients with posterior capsular opacification were selected on first come first basis. Patients above 40 years of age with history of cataract surgery and complaining of defective vision and visual acuity of 6/18 or worse were included in the study. All the patients underwent detailed examination which included complete medical and ophthalmic history; Best corrected visual acuity, Retinoscopy and Slit lamp examination was done. Intra ocular pressure was recorded by Goldmanns Applanation Tonometry. Fundus examination was performed by direct/ indirect and slit lamp biomicroscopy with 78D lens to look for posterior segment pathology like Cystoid macular oedema, Retinal breaks, Retinal detachment etc. Patients diagnosed with posterior capsular opacification underwent Nd-YAG laser capsulotomy under topical anesthesia.

Procedure of Nd- YAG laser capsulotomy: Patients were explained in detail the purpose, nature and complication associated with the procedure and informed consent was taken. Topical medications like Brimonidine eye drops and lignocaine eye drops 4% were instilled before the procedure. Using 1 to 2 MJ per pulse from Q switched Nd- YAG laser, opening was made into the posterior capsule. Post laser patient was evaluated after one hour under slit lamp and Intra ocular pressure was recorded. Topical steroid eye drops and Brimonidine eye drops were advised for one week. Patients were followed after 1 week and six weeks, Best corrected visual acuity, intraocular pressure and if any complications were noted.

RESULTS

Study included 100 patients who were diagnosed with posterior capsular opacification. All the patients underwent Nd YAG laser capsulotomy and followed after one hour, one week and after 6 weeks. Of 100 cases 61 were females and 39 males.

Table 1: Age and Sex distribution of study population

| Age in Years | Male | Female | Total |
|--------------|------|--------|-------|
| 41-50 | 8 | 9 | 17 |
| 51-60 | 14 | 26 | 40 |
| 61-70 | 11 | 18 | 29 |
| > 70 | 6 | 8 | 14 |
| Total | 39 | 61 | 100 |

Posterior capsular opacification was common in the age group 51-60 with 40% followed by 29% in the age group 61-70 years.[Table 1]

Elschnig's pearl was the most common type of posterior capsular opacification with 82% followed by fibrous type with 18%.

Table 2: Duration of development of PCO after cataract surgery

| Duration in months | Number of eyes | Percentage |
|--------------------|----------------|------------|
| 6 -12 months | 18 | 18% |
| 12-24 months | 30 | 30% |
| 24-36 months | 36 | 36% |
| > 36 months | 16 | 16% |
| | 100 | 100% |

66% of the patients developed posterior capsular opacification and underwent Nd YAG laser capsulotomy between 12 to 36 months after cataract surgery.[Table 2]

Table 3: Best corrected Visual acuity before and after Nd YAG capsulotomy

| Best corrected visual acuity | Before Nd YAG lasers | Percentage | After Nd YAG lasers | Percentage |
|------------------------------|----------------------|------------|---------------------|------------|
| Less than 6/60 | 36 | 36% | 04 | 04% |
| 6/60-6/18 | 58 | 58% | 08 | 08% |
| 6/18-6/6 | 06 | 06% | 88 | 88% |
| Total | 100 | 100% | 100 | 100% |

Best corrected visual acuity of 6/18 to 6/6 following Nd-YAG laser capsulotomy was reported in 88% of patients. Only 4% of patients had visual acuity less than 6/60.[Table 3]

Table 4: Complications following Nd YAG laser capsulotomy

| Complication | Number of cases | Treatment advised |
|------------------------|-----------------|----------------------------------------------------------------------------------|
| IOL Pitting | 6 | none |
| Transient rise of IOP | 4 | Tab. Diamox 250mg bd for 3 days. Brimonidine eye drops 2 times daily for a week. |
| Iridocyclitis | 1 | Prednisolone eye drops. Atropine eye ointment |
| Cystoid macular oedema | 4 | Topical NSAIDS |
| Total | 15 | |

15% of patients developed minor complications like IOL pitting, Transient rise in IOP and cystoid macular oedema etc. [Table 4]

DISCUSSION

Advent of various micro surgical procedures and the reduced rate of complication have raised the number of cataract surgeries performed and also the expectations of the patients. Posterior capsular opacification has become the commonest cause of decrease in visual acuity following cataract surgery. Nd- YAG laser capsulotomy is a relatively safe technique and a standard treatment used for the treatment of posterior capsular opacification⁸.

Study included 100 patients who underwent Nd- YAG laser capsulotomy, females were predominant in this study contributing to 61%, which was not statistically significant ($P>0.05\%$). Younas khan et al⁹ and Hasan et al¹⁰ has reported

similar sex ratio. Several studies showed varied results. Incidence of Posterior capsular opacification was not significantly associated with gender distribution.

Posterior capsular opacifications are of various types like Elschning's pearls, fibrous type, Soemerring's ring etc. Elschning's pearl was the most common type of posterior capsular opacification reported with 82% followed by fibrous type with 18%. Hasan et al¹⁰ in his study reported Elschning's pearl as the most prominent type of posterior capsular opacification.

Incidence of posterior capsular opacification increases with the duration of the surgery. Several factors contribute to early formation of posterior capsular opacification like incomplete removal of cortical matter, improper cleaning of capsular bag, sulcus placed Intraocular lens etc. Present study reported that the interval between cataract surgery and PCO formation ranges from 6 months to 36 months. 66% of patients developed PCO between 12 to 36 months after cataract surgery. Kundi et al. reported that average duration for performing Nd- YAG laser capsulotomy was 24 months¹¹

Nd- YAG laser capsulotomy causes significant improvement in visual acuity of patients with posterior capsular opacification. 94% of the patients had best corrected visual acuity of 6/18 or worse at presentation (36% had visual acuity less than 6/60 and 58% had visual acuity ranging from 6/60 to 6/18). 88% of patients visual acuity improved to 6/18 and better to 6/6 following Nd- YAG laser capsulotomy. 4% had visual acuity less than 6/60 and 8% had visual acuity ranging from 6/60 to 6/18. Similar results were reported in a study by Panezai MN et al. Which showed that 91% of patients had improvement in visual acuity between 6/18 and 6/6 following Nd- YAG laser capsulotomy¹².

Nd- YAG laser capsulotomy is a laser based procedure which may be associated with complications. Rate and severity of complications are minimal with Nd- YAG lasers. Common complications reported by Nd- YAG laser capsulotomy are intraocular lens pitting, transient rise of intraocular pressure, Cystoid macular oedema, Retinal detachment and Iridocyclitis. Complications reported in the present study are Intraocular lens pitting in 6 cases, transient rise of intraocular pressure in 4 patients, Cystoid macular oedema in 4 patients and Iridocyclitis in 1 patient. Most of these complications were not sight threatening.

Transient rise of intraocular pressure can be prevented by prophylactic instillation of Brimonidine eye drops one hour before the procedure. High myopic patients, patients with retinal degenerations and patients with other eye retinal detachment are at risk of developing retinal detachment following Nd- YAG laser capsulotomy. Barrage lasers for retinal degenerations, minimal amount of laser energy are the

precautions used to prevent the development of retinal detachment.

CONCLUSION

Nd- YAG laser capsulotomy is the widely practiced procedure for the management of Posterior capsular opacification. It is a non invasive, relatively safe technique and can be performed as an outpatient procedure. Improvement in the visual acuity was excellent following Nd-YAG laser capsulotomy. Complications following Nd- YAG laser Capsulotomy are very few and are not sight threatening.

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