

Effects of Nd:YAG laser capsulotomy in posterior capsular opacification

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Abstract

Background: Posterior capsular opacification (PCO) is the most common long-term complication of cataract surgery in both phacoemulsification and extracapsular cataract extraction (ECCE). The overall incidence of PCO and the incidence of neodymium-doped yttrium–aluminum–garnet (Nd:YAG) laser posterior capsulotomy has decreased from 50% in the 1980s and early 1990s to less than 10% today. Reported complications of Nd:YAG laser posterior capsulotomy include elevated intraocular pressure, iritis, corneal damage, intraocular lens (IOL) damage, cystoids macular edema, disruption of the anterior hyaloid surface, increased risk of retinal detachment, and IOL movement or dislocation. In some patients, a refraction change is noticed after Nd:YAG laser posterior capsulotomy, but proving this remains difficult. **Materials and Methods:** Nd: YAG LASER capsulotomy was performed in 200 eyes of 200 patients, some with pseudophakia and some with aphakia at Kurnool medical college, Kurnool. They were followed up between October 2008 and September 2010. **Results:** Elevation of IOP has been well documented after anterior segment laser procedures. The IOP rise after YAG laser posterior capsulotomy is of short duration starting about 1 hr after laser procedure and lasting for 24 hrs. In this study, in 1 case IOP came down to normal level after 3 days and in another case after 7 days. In this study, in 3% of the cases there was no rise of IOP. The incidence of elevated IOP of 1-5 mm of Hg was 23%, IOP of 6-12 mm of Hg was 49%, IOP of 13-18 mm of Hg was 24% and IOP of 19-25 mm of Hg was 1%. In this study, after laser capsulotomy, 0.5% timolol eye drops and 0.03% flurbiprofen eye drops was prescribed. And if the post laser IOP was more than 30 mm of Hg, tab. acetazolamide 250 mg BD was added. **Conclusion:** YAG laser posterior capsulotomy is a safe procedure. Since significant rise spikes in IOP occur after the laser procedure, it is very important to put the patients on topical timolol (beta-blocker) eye drops and to record the IOP at regular intervals after 1 hr, 4 hrs and 24 hrs. When the patients come for follow up after 1 week, 2 weeks, 1 month and after 3 months, it is always important to look for cystoid macular edema, retinal detachment and other complications.

Keywords: Phacoemulsification, Posterior capsular opacification, YAG laser posterior capsulotomy, IOP, Retinal detachment, CME.

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INTRODUCTION

Posterior capsular opacification (PCO) is the most common long-term complication of cataract surgery in both phacoemulsification and extracapsular cataract extraction (ECCE). The incidences of PCO were 11.8% at 1 year, 20.7% at 3 years, and 28.4% at 5 years after surgery.¹ Fortunately, the overall incidence of PCO and the incidence of neodymium-doped yttrium–aluminum–garnet (Nd:YAG) laser posterior capsulotomy has decreased from 50% in the 1980s and early 1990s to less than 10% today.^{2,3} Some patients experience significant vision complications including visual acuity, glare, and contrast sensitivity,

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which often require further treatment. Currently, the standard treatment for PCO is Nd:YAG laser posterior capsulotomy, which has a success rate of more than 95%.² Reported complications of Nd:YAG laser posterior capsulotomy include elevated intraocular pressure, iritis, corneal damage, intraocular lens (IOL) damage, cystoids macular edema, disruption of the anterior hyaloid surface, increased risk of retinal detachment, and IOL movement or dislocation.^{4,5} In some patients, a refraction change was noticed after Nd:YAG laser posterior capsulotomy, but proving this remains difficult. To improve this visual acuity (which is decreased by PCO), capsulotomy needs to be done. In this study, Nd; YAG laser posterior capsulotomy was done and the resultant improvement in the visual acuity and the incidental complications were assessed and managed accordingly.

AIM OF THE STUDY

In this short-term study, aim is to study the visual outcome and the incidence of immediate and late complications of Nd; YAG laser capsulotomy like rise in the Intra Ocular pressure (IOP), pitting of the IOL, anterior hyaloid face rupture, Cystoid Macular Edema (CME), retinal detachment, delayed endophthalmitis.

MATERIALS AND METHODS

Nd; YAG LASER capsulotomy was performed in 200 eyes of 200 patients, some with pseudophakia and some with aphakia at Kurnool medical college, Kurnool. They were followed up between October 2008 and September 2010. The average period of follow up was 3 months. The postoperative period varied from 3 months to 2 years. The chief complaint of all these cases was diminished vision which varied from counting finger - 1 meter to 6/24. Patients with 6/24 were not satisfied with the quality of vision they had. After a thorough evaluation to confirm that visual loss was due to posterior capsular opacification, patients were selected for YAG capsulotomy.

PRELASER REGIME: Grade posterior capsular opacification, best corrected visual acuity by means of retinoscopy and pinhole, slit lamp examination to rule out any anterior segment pathology, direct ophthalmoscopy and indirect ophthalmoscopy, if possible to assess posterior capsular opacity and to look for any posterior segment pathology, intraocular pressure recording by Goldman's applanation tonometer. Informed consent was taken from all patients. The parameters energy level, thickness of PCO and energy required, complications like IOP rise, CME, anterior hyaloids face rupture, retinal detachment were taken into consideration. Patients with decreased visual acuity, without any kind of inflammation were selected. Follow up was done after 24 hours, 3rd day, 1 week, 2 weeks, 1 month, 3 months. During the follow up

visual acuity, IOP, patency of the capsulotomy, position of IOL, fundus (with direct and indirect ophthalmoscopy) were monitored.

RESULTS AND DISCUSSION

Nd; YAG LASER CAPSULOTOMY: Posterior capsular opacification is a major complication of intraocular lens implantation for the cataract surgeon. The use of YAG laser has definitely simplified the treatment of posterior capsular opacification. Being non-invasive, it is ideal. In this study of 200 cases, the main aim was to evaluate the results of YAG laser posterior capsulotomy in 200 eyes of 200 patients. The cases were studied according to age/sex wise and nature of cataract and duration between cataract extraction and diminution of vision. The complications and results of Nd; YAG laser posterior capsulotomy are discussed as follows;

Increased intraocular pressure (IOP)

Elevation of IOP has been well documented after anterior segment laser procedures. The IOP rise after YAG laser posterior capsulotomy is of short duration starting about 1 hr after laser procedure and lasting for 24 hrs. In this study, in 1 case IOP came down to normal level after 3 days and in another case after 7 days. In this study, in 3% of the cases there was no rise of IOP. The incidence of elevated IOP of 1-5 mm of Hg was 23%, IOP of 6-12 mm of Hg was 49%, IOP of 13-18 mm of Hg was 24% and IOP of 19-25 mm of Hg was 1%. In this study, after laser capsulotomy, 0.5% timolol eye drops and 0.03% flurbiprofen eye drops was prescribed. And if the post laser IOP was more than 30 mm of Hg, tab. acetazolamide 250 mg BD was added. In a study by Niharika K Shetty *et al.* it was observed that the patients who received more than 30 shots the IOP rise persisted even after 7 days and these patients were observed for 7 days and then started on anti-glaucoma medication. The patients who received more than 40 shots had a significant rise in IOP and required treatment in form of anti-glaucoma medications immediately after the procedure for one week post-procedure. All the patients had a rise in IOP 2 hours post-procedure irrespective of the number of shots. Hence IOP documentation of IOP 2 hours post-procedure was observed to be more predictive of persistent IOP rise compared to immediate post-procedure IOP.⁶

Retinal detachment:

In this study 2 cases developed supero-temporal retinal detachment after 3 months of YAG laser capsulotomy, who presented with sudden loss of vision. No risk factors like high myopia, retinal degeneration were detected. Numerous studies have examined the relationship between Nd; YAG laser posterior capsulotomy and development of retinal detachment. Aron Rosa *et al.* reported an incidence of 0.08%.⁷

Cystoid macular edema (CME)

The development of CME after Nd:YAG laser posterior capsulotomy has been demonstrated in many studies. The main diagnostic tool in this study was indirect ophthalmoscopy. In this study 6 cases were identified as having cystoid macular edema. 4 cases developed macular edema followed by CME after 2 months. Visual acuity fell down from 6/12 to 6/36. In 2 cases YAG capsulotomy was done after 8 months of cataract surgery and in other 2 cases after 6 months of cataract surgery. In another case macular edema developed after 3 weeks followed by CME after 2 months. Vision fell from 6/12 to 6/36. In this case YAG was done after 5 months after cataract surgery. According to Abel RJ⁸ *et al.* the incidence of CME was 5.4%. In this study, the incidence of CME is 2%.

IOL pitting

In this study, it was noticed in 6 cases. But in none of these cases it was symptomatic. In a study Bastiaan Kruijt *et al.* the damage as found in the two IOLs was considered representative for the commonly observed laser damage in IOLs, which was scored mild to moderate.⁹

Anterior hyaloids face rupture

In this study, it was seen in 24 cases, all of which were pseudophakic eyes. In a study by Emina Alimanovic-Halilovic *et al.* rupture of the hyaloid face was seen in 7.5% of the cases.¹⁰

Posterior capsule reopacification:

In this study, it was noted in 2 cases. One 6 yr old female child and one 9 yr old boy who were treated with YAG capsulotomy for PCO developed PC reopacification. They were again treated with YAG capsulotomy after 2 months. R J McPherson *et al.* reported a case of complete posterior capsule reopacification after successful neodymium:YAG (Nd:YAG) capsulotomy in an adult. They found after review of the records of all patients who had an Nd:YAG capsulotomy at their hospital an incidence of reopacification of 0.7%. All affected patients were younger than 50 years at the time of cataract surgery.¹¹

Other complications

Corneal complications like epitheliopathies and exacerbation of epithelial dystrophies, and corneal burns have not been reported.

Improvement in visual acuity: In 16 cases, there was no improvement in vision, due to presence of age-related macular degeneration (ARMD) in 8 cases. It was due to

amblyopia in 2 cases, chorioretinal degeneration in 6 cases involving the papilla-macular bundle. In 6 cases, there was fall of vision due to cystoid macular edema, and in 2 cases the fall of vision was due to retinal detachment (RD), in which the vision was initially good after YAG, but before developing RD.

CONCLUSION

YAG laser posterior capsulotomy is a safe procedure. Since significant rise spikes in IOP occur after the laser procedure, it is very important to put the patients on topical timolol (beta-blocker) eye drops and to record the IOP at regular intervals after 1 hr, 4 hrs and 24 hrs. When the patients come for follow up after 1 week, 2 weeks, 1 month and after 3 months, it is always important to look for cystoid macular edema, retinal detachment and other complications.

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