

Original article :

Clinical study of posterior capsular opacification after ecce and role of ND-YAG laser posterior capsulotomy in its treatment

¹Dr Swapna Sadashiv Gholve , ²Dr Sohel Irfan Mohd.Khan

¹Resident Doctor, Department of Ophthalmology Dr SCGMC Nanded.

²Associate Professor, Department of Ophthalmology, Dr SCGMC Nanded

Corresponding author: Dr Swapna Sadashiv Gholve



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License

Date of submission: 17 January 2023

Date of Final acceptance: 09 March 2023

Date of Publication: 30 March 2023

Source of support: Nil

Conflict of interest: Nil

Abstract

Introduction: Small incision cataract surgery (SICS) became a good alternative for surgeons who did not have access to a phacoemulsification machine. Phacoemulsification technique reduced the size of incision further and foldable IOL came into use.

Material and methods: This study was conducted in the Department of Ophthalmology in a tertiary care hospital and medical college , during the study period of 18 months.The study was conducted after approval from the institutional ethics committee . Eyes of 150 patients presenting with PCO and underwent Nd-YAG laser capsulotomy were studied.

Results : The present study showed IOP spikes in 12 eyes out of 150 eyes in the follow up of 1st hr, 4th hr and 1st week, 4th week and 6th week following Nd:YAG posterior capsulotomy. Aqueous flare and floaters was seen in 6 patients . IOL pitting was found in two eyes out of 150 eyes . The study showed that 58 % patients had developed pearls type of PCO, 30 % developed somerrings ring and 12 % eyes had developed fibrosis type of PCO.

Conclusion:Although this procedure is safe, it is associated with complications like transient intraocular pressure rise, pitting of the intraocular lens, mild iritis, which are not vision threatening and they are transient.

Therefore this treatment modality iscost effective and safe.

Keywords : posterior capsular opacification, ND-YAG laser posterior capsulotomy

Introduction:

Small incision cataract surgery (SICS) became a good alternative for surgeons who did not have access to a phacoemulsification machine. Phacoemulsification technique reduced the size of incision further and foldable IOL came into use. Posterior Capsular Opacity (PCO, secondary cataract ,after cataract) is the most common sequelae of ECCE,SICS or phacoemulsification. PCO is physiological postoperative consequence of uneventful uncomplicated Extracapsular cataract surgery[1] Visually significant PCO may occur in up to 25% of patients

over a 5-year period.[2] PCO is caused by lens epithelial cells that remain in the capsular bag after cataract surgery. They migrate, proliferate and transform to produce Elschnig's pearls and capsular fibrosis.[3] The growth of the epithelial cells of young people is more than elderly; hence, age is also believed to be factor in the incidence of PCO.[4] Posterior Capsular Opacification (PCO), by causing forward and backward light scattering, reduces Visual Acuity and Contrast Sensitivity .[5-7] When PCO encroaches onto the visual axis. it produces light scattering and visual deterioration. Visually significant PCO is usually managed by creating an opening within the opaque posterior capsule using the Neodymium:Yttrium Aluminium Garnet (Nd: YAG) laser. With modern techniques and IOLs, the expected rate of PCO and subsequent Nd: YAG laser posterior capsulotomy rate is decreasing to less than 10% [8]. There are very few studies about PCO and use of Nd:YAG laser capsulotomy in its treatment in rural and tribal area. Hence, we have undertaken this study to understand how to prevent PCO and use of Nd-YAG laser as a effective treatment for it.

Material and methods:

This study was conducted in the Department of Ophthalmology in a tertiary care hospital and medical college , during the study period of 18 months.The study was conducted after approval from the institutional ethics committee . Eyes of 150 patients presenting with PCO and underwent Nd-YAG laser capsulotomy were studied.

Study design: A Prospective longitudinal Observational Descriptive Study.

Complete innumeration method , we studied all cases which occurred in data collection period with consideration of inclusion and exclusion criteria .

INCLUSION CRITERIA:

- 1-All patients who were previously operated for cataract by ECCE + IOL with visually significant PCO.
- 2- Patients undergoing Nd:YAG laser posterior capsulotomy.
- 3-All age group.
- 4-Patients willing to give informed consent for treatment and study.
- 5- Patients ready to come for follow up.

EXCLUSION CRITERIA –

- 1-Any patient who does not give consent to be the part of study.
- following criteria are excluded to be included for ND-YAG laser capsulotomy-
- 2-Patients with very thick PCO with membrane who needed surgical intervention were excluded from the study
 - 3- Active ocular pathology such as uveitis, infection.
 - 4-Pre-existing ocular condition which can lead to decrease in vision after laser capsulotomy as such glaucoma , any retinal pathology .

Results:

During the study period 150 patients with PCO, who attended OPD, were assessed for PCO and consent was taken. The following observations were made.

Table No.1: Comparison of visual acuity before and after laser

Visual acuity	No. of cases before laser n (%)	No. of cases after laser n (%)
6/6	0	71(48)
6/9	0	48(32)
6/12	0	15 (10)
6/18	30 (20)	09(06)
6/24	39 (26)	03(02)
6/36	51 (34)	0
6/60	24 (16)	03(02)
CF	06 (04)	0
Total	150	150

Table No 2 : Time interval between cataract surgery and PCO Development

Time interval (years)	No. of cases (n)	Percentage (%)
6months -1 yr	63	42
1-2 yr	42	28
2-3 yr	27	18
3-4 yr	18	12
Total	150	100 %

DISCUSSION:

Posterior capsular opacification is one of the most common long term complication following various types of ECCE and IOL implantation. Nd:YAG laser therapy presents the advantage of a noninvasive, effective, relatively safe technique to manage intact posterior capsule that opacify post-operatively.

The present study of 150 eyes, 63 males and 87 females underwent YAG laser capsulotomy as treatment for PCO was conducted in department of ophthalmology in a Tertiary health care centre .

The mean time interval between cataract surgery and PCO development in our study was 6 months to 1 year in 64 patients (42%) , 42 (28%) patients developed PCO in 1-2 years , 25(18%) patients had

time interval of 2-3 years and 18(12%) developed PCO in 3- 4 years . In our study the time interval between surgery and development of PCO ranged from 6 month to less than 5 years.

Apple et al reported that the time interval between surgery and PCO development varies widely with the range from 3 months to 4 years after surgery ⁽⁹⁾.

The aim of the study was to , determine factors affecting posterior capsular opacification after ECCE visual outcome and complications . In this study 150 eyes of significant PCO were evaluated for visual acuity and IOP was recorded after 1st hr, 4th hr, 1st week, 4th week and 6th week. The time interval between cataract surgery and PCO development was found in the range from 6 months to 4 years. Energy level used was in the range of 1-3 mJs to treat PCO. In our study visual acuity before Nd: YAG laser was in the range of CF to 6/18, Improvement in the visual acuity after laser in the range of 6/60 to 6/6.

The present study showed IOP spikes in 12 eyes out of 150 eyes in the follow up of 1st hr, 4th hr and 1st week, 4th week and 6th week following Nd:YAG posterior capsulotomy. Aqueous flare and floaters was seen in 6 patients. IOL pitting was found in two eyes out of 150 eyes . The study showed that 58 % patients had developed pearls type of PCO, 30 % developed somerrings ring and 12 % eyes had developed fibrosis type of PCO.

Conclusion:

Although this procedure is safe, it is associated with complications like transient intraocular pressure rise, pitting of the intraocular lens, mild iritis, which are not vision threatening and they are transient. Therefore this treatment modality is cost effective and safe.

References:

1. Aslam TM, Devlin H, Dhillon B. Use of Nd: YAG laser capsulotomy. *Surv Ophthalmol* 2003;48(6):594-612
2. Schaumberg DA, Dana MR, Christen WG, Glynn RJ . A systematic overview of the incidence of posterior capsule opacification. *Ophthalmology* 1998; 105(7): 1213–1221.
3. Apple DJ, Peng Q, Visessook N, Werner L, Pandey SK, Escobar G, et al. Eradication of posterior capsule opacification. Documentation of a marked decrease in Nd:YAG laser capsulotomy rates noted in an analysis of 5416 pseudophakic human eyes obtained postmortem. *Ophthalmology* 2001; 108:505-18.
4. Powe NR, Schein OD, Gieser SC, et al. Synthesis of the literature on visual acuity and complications following cataract extraction with intraocular lens implantation. Cataract Patient Outcome Research Team. *Arch Ophthalmol* 1994;112(2):239-52
5. Cheng CY, Yen MY, Chen SJ, Kao SC, Hsu WM, Liu JH et al. Visual acuity and contrast sensitivity in different types of posterior capsule opacification. *J Cataract Refract Surg.* 2001; 27:1055–60.
6. Meacock WR, Spalton DJ, Boyce J, Marshall J. The effect of posterior capsule opacification on visual function. *Invest Ophthalmol Vis Sci.* 2003; 44:4665–9.
7. Hayashi K, Hayashi H, Nakao F, Hayashi F. Correlation between posterior capsule opacification and visual function before and after neodymium: YAG laser posteriorcapsulotomy. *Am J Ophthalmol.* 2003; 136:720–6.
8. Apple DJ, Peng Q, Visessook N, Werner L, Pandey SK, Escobar GM, et al. Surgical prevention of posterior capsule opacification.Part I. Progress in eliminating this complication of cataract surgery. *J Cataract Refract Surg* 2000; 26: 180- 7.
9. L.C.Dutta. *Modern Ophthalmology*: Edited by: LC Dutta 1994.
10. Minello AA, Prata JA, Mello PA. Efficacy of topic ocular hypotensive agents after posterior capsulotomy. *Arq Bras Oftalmol* 2008;71(5):706-710.