Original Research Paper

Volume-9 | Issue-1 | January-2019 | PRINT ISSN - 2249-555X

Ophthalmology

A STUDY FOR THE EVALUATION FOR THE MOST PROBABLE CAUSE OF POSTERIOR CAPSULAR OPACIFICATION FORMATION IN POST OPERATIVE CATARACT PATIENTS

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ABSTRACT

Background: One of the most common complication after cataract surgery is Posterior capsular opacification (PCO) or secondary cataract, if it covers pupillary area vision is reduced. PCO is treated satisfactorily using laser and if dense by surgical capsulotomy.

Aim: In this study proposed we evaluated the most likely cause of PCO formation and role of Neodymium: Yttrium Aluminum Garnet Laser capsulotomy in its management in patients with PCO, operated at the Ophthalmology department of MGMMC, Indore.

Methods: An observation study was conducted on 600 eyes of 600 patients who underwent small incision cataract surgery at MYH Indore. Patients were followed up for 6 months and formation of PCO postoperatively and role of Neodymium: Yttrium Aluminum Garnet Laser capsulotomy in its management was evaluated.

Result: We found that, PCO formation is mostly associated with systemic illness like Diabetes or any ocular pathology, which correlates with other studies on PCO development. Clinically significant PCO was found in 229 patients (38.16%) who were treated with Nd YAG capsulotomy.

Conclusion: PCO develops early in patients suffering with systemic illness, if the IOL is in sulcus, in pseudoexfoliation syndrome. It can be prevented by accurate hydrodissection, removing of cortical mass, polishing of capsule and intracapsular fixation of lens and by controling post-operative inflammation.

KEYWORDS : Posterior Capsular Opacification, Cataract surgery, Nd-YAG capsulotomy

INTRODUCTION:

The most common treatable cause of blindness is cataract. Sushruta treated cataract by the technique of couching.

Initially intracapsular cataract extraction (ICCE) was the only option, where the whole lens along with the entire capsule was extracted and hence was not possible to implant IOL.

Extra capsular cataract extraction (ECCE) gained popularity in 1980's, here posterior capsule was preserved permitting IOL insertion, in ECCE incision of 10-11 mm with suture is required. Small incision cataract surgery (SICS) is a good alternative with smaller incision size. Phacoemulsification further reduces the size of incision and hence a better postoperative outcome.

PCO is the most common late complication of cataract surgery occurring in more than 50 % of patients within 2 years post operatively[1,2,3] . Sir Herold Ridley in 1950 performed the first IOL implantation, since then the technology has undergone a variety of improvement which reduces the incidence of PCO.

The lens epithelial cells that remain in the capsular bag after cataract surgery migrate, proliferate and transform to produce PCO. When the pupillary area is involved, it leads to light scattering and visual deterioration[4] i.e. visually significant PCO. PCO development is age dependent occurs more in younger patients[5,6,7]. It is treated by creating opening (capsulotomy) within posterior capsule using Neodymium-doped yttrium aluminum garnet (Nd: YAG) laser. With more advanced technique and technology and improved IOLs the rate of PCO has reduced to less than 10 %.

MATERIAL AND METHODS:

A prospective observation study of 600 patients i.e. 600 pseudophakic eyes, attending out patient department of MGMMC, Indore of age 45 years and above, of either sex who underwent SICS with PMMA PCIOL, was conducted between August 2016 to July 2017. Patients with complicated cataract were included as well. Patients were thoroughly examined on there follow up.

On 1st, 3rd and 6 months postoperative follow up, the following parameters were examined:

- Distant and near visual acuity, unaided as well as aided
- Slit lamp examination of anterior segment
- Direct and Indirect ophthalmoscopy to assess media clarity and retinal pathology
- PCO was determined by calculating the area of opacity from retro-illumination image.
- Patients were asked for history of systemic illness

History of any operative complication/event was asked for.

After thorough examination in patients with visually significant PCO Nd: YAG laser capsulotomy was done and the patients were put on topical antiglaucoma medication and steroid for a week and reviewed for visual acuity assessment and refractive correction was prescribed if required.

RESULTS:

600 patients were evaluated for 6th month after cataract surgery. Out of which 239 patients complained of blurry vision. After detailed examination it was found that 231 patients were having PCO formation out of which 229 patients were having clinically significant PCO . On examination it was found that 13 patients had dry age related macular degeneration (ARMD), 4 were having both ARMD and PCO. It was found that about eighty-nine (89) patients had residual lens matter after cataract surgery. Twenty-two (22) patients were having IOL capture with fibrous type of PCO suggesting implantation of lens in sulcus, predispose PCO formation. 91 patients with PCO on history found to be suffering from diabetes and were on treatment, out of which 11 patients had diabetic retinopathy of various grades and some degree of Macular edema. 24 patients had posterior synechiae mostly suggestive of uveitis.

229 patients who had clinically significant PCO were treated using Nd-YAG laser and pupillary area was cleared. After the procedure they were put on anti-glaucoma and steroid eye drops for a week .On their follow up on 7th day after capsulotomy, they were examined with slit

lamp for any residual PCO and refractive correction was prescribed, if required. After capsulotomy vision improvement was observed by at least 1 line. Two patients had thick PCO which was not satisfactorily treated with Nd-YAG , in those patients needle capsulotomy was planned.

Observation Table 1: Findings and Counts of PCO Patients

Examination	No. of patients
Diabetic	91
Cortical matter	89
Synechiae	24
PXC	3
IOL in Sulcus	22
Total	229

Note: Two diabetic patients were not having visually significant PCO.

DISCUSSION:

PCO encroaching over pupillary area develops in more than 25% of patients after SICS with PCIOL implantation in first 6 months after surgery. Patients suffering with diabetes, uveitis, having residual lens matter postoperatively, IOL in sulcus are prone to PCO development. Some studies correlate a large incision with increased post-operative blood-aqueous barrier damage and thus increased risk of PCO formation8. Ebihara et al 2007, in his study concluded that diabetic patients had significantly more severe PCO after cataract surgery than non-diabetic patients9.

Hydrodissection of nucleus, followed by its rotation during surgery results in removal of maximum lens fibers and epithelial cells at the equator of the capsular bag, which reduce the chances of PCO formation. By freeing and rotating the lens nucleus and cortex removal without zonular-capsular rupture.10,11

Yinglei Zhang, MD et al 2017, concluded that PCO formation is the most common complication after cataract surgery in patients associated with uveitis12. Michael Küchle, et al 1997, concluded that increased frequency of secondary cataract could be considered as another potential complication of cataract surgery in eyes with PEX13.

IOL is placed in the bag in majority of patients followed by SICS. In cases where either or both haptics are not placed in capsular bag, a potential space is created which allows a way for cells to grow and migrate posteriorly towards the visual axis. IOL in capsular bag creates a barrier effect which results in hindrance to migration of equatorial lens epithelial cells over posterior capsule. Nishi et al support a physiological barrier to cellular migration through the phenomenon of contact inhibition and this factor certainly play a role in prevention of PCO14. Donald T.H et al, in his article showed that in the sulcus IOL develops PCO earlier as compared to in the bag IOL15.

Central PCO obscuring the visual axis can be treated with non-surgical neodymium:YAG (Nd: YAG) laser capsulotomy or surgical intervention such as posterior capsule scraping. The rare complications after Nd: YAG laser capsulotomy includes a rise in intraocular pressure, glaucoma, cystoid macular edema, and retinal detachment16.

CONCLUSION:

PCO is the most common late complication of uneventful cataract surgery. A Carefull use of surgical techniques is the mainstays for preventing the development of post-operative posterior capsule opacification in humans. And it can be treated using Nd-YAG capsulotomy in an excellent way.

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