Effect of anterior capsular polishing on the rate of posterior capsule opacification: A retrospective analytical study

Rahul Baile, MS; Meghana Sahasrabuddhe, MBBS; Snehal Nadkarni, MS; Vasudeo Karira; Juilee Kelkar, MBBS

Abstract

Aim: To determine whether anterior capsule polishing during cataract surgery done by phacoemulsification has any effect on the rate of posterior capsule opacification.

Materials and methods: We conducted a 3 year retrospective analytical study at our hospital. The medical records of patients who underwent cataract extraction by phacoemulsification with foldable square edge hydrophilic PCIOL between April 2007 and March 2010 were reviewed. The study included 1009 eyes of 950 patients who underwent phacoemulsification with foldable square edge hydrophilic IOL in the bag implantation with anterior capsular polishing. The control group included 981 eyes of 957 patients in whom anterior capsular polishing was not done. Patients in the age group of 45–65 years with well dilating pupils were included in the study. They were evaluated at 1 week, 1 month and 1 year post-operatively. Exclusion criteria included glaucoma, shallow anterior chamber, uveitis, high myopia, pseudoexfoliation, diabetes mellitus, traumatic cataracts, posterior polar cataract, subluxated cataracts, previous ocular surgeries, patients allergic to dilating drops, and steroid intake. Intraoperatively, the exclusion criteria were not achieving the total anterior capsule cover on the IOL optic, sulcus fixated IOL, and any intraoperative complications like posterior capsule rupture. After bimanual irrigation/aspiration, all enrolled patients were randomly assigned to receive either 360 degree anterior capsular polishing or No anterior capsular polishing and results were studied.

Results: The rate of posterior capsule opacification in the study group and in the control group was not statistically significant. Conclusion: Though it was thought that anterior capsular polishing will lead to reduced rate of PCO formation, our study showed that there was no significant difference in PCO formation between the two groups. However, it was seen that the rate of anterior capsule opacification and capsular phimosis showed a significant reduction in cases in which anterior capsular polishing was done.

Keywords: Posterior capsular opacification, Phacoemulsification, Anterior capsular polishing

Introduction

Phacoemulsification is a procedure in which ultrasound energy is used to emulsify the cataract and then in the bag IOL is inserted. This can be achieved through minimal size of incision like 3.2 mm, 2.8 mm and nowadays microphaco can be done through incision as small as 1.2 mm. After the removal of nucleus from the bag the remaining cortex is removed using thorough irrigation and aspiration. The posterior capsule and anterior capsular rim is polished from inside using capsule polishing canula. This ensures the removal of all lenticular cells. These residual cells can cause opacification of posterior capsule or anterior capsular rim by cellular proliferation.
Posterior capsule opacification (PCO) is the most common complication after cataract extraction with intraocular lens (IOL) implantation (Fig. 1). Nd:YAG laser capsulotomy is a definitive treatment of PCO; however, there are rare but significant complications of capsulotomy, including cystoid macular oedema, retinal detachment, and increased intraocular pressure. In addition, Nd:YAG capsulotomy to treat PCO results in increased requirements for patient follow up and has a substantial socioeconomic impact.  

Posterior capsule opacification can be in the form of thin membrane over PC, or Elschnig’s pearls or Soemmering’s ring (Fig. 2). Anterior capsular rim can get opacified from inside causing capsular phimosis. Posterior capsule opacification (PCO) causes decreased vision and reduced contrast sensitivity. This is one of the common causes of late vision
loss after cataract surgery. Meticulous removal of cortical matter ensures decreased incidence of PCO. Treatment for PCO was capsulectomy in the past. Recent treatment for PCO is YAG Laser capsulotomy. This was a 3 year retrospective study carried out at our hospital from April 2007 to March 2010, we reviewed records of patients who underwent phacoemulsification with foldable square edge hydrophilic PCIOL implantation, and comparison was done between PCO occurrence in the case of polishing and not polishing of the posterior capsule.

Materials and methods

This was a 3 year retrospective analytical study. It included patients operated for cataract using phacoemulsification with acrylic, square edge hydrophilic foldable PCIOL (Figs. 3 and 4). All patients operated in a period of 2 years, from April 2007 to March 2009. This study was done after taking permission from hospital’s ethical committee.

All surgeries were performed by one surgeon. After retrobulbar anaesthesia, a clear corneal temporal incision was made with a 2.75 mm keratome blade. Viscoelastic was used to inflate the anterior chamber and continuous curvilinear capsulorhexis of about 4–5 mm was performed. Hydrodissection and “divide and conquer” phacoemulsification were performed and the cortex was removed with automated irrigation/aspiration. The posterior capsule was vacuumed but no other capsular polishing was performed. Viscoelastic was then inserted into the capsular bag, followed by “in the bag” placement of the posterior chamber IOL. Patients with any of the following conditions were excluded: capsule tear, vitreous loss, incomplete cortical cleanup, IOL not fixated in capsular bag, PCO noted at the time of surgery, congenital cataract, history of trauma, history of preoperative uveitis, or postoperative follow up less than 5 months.

Nd:YAG capsulotomy was performed based on subjective patient complaints or measurable decrease in visual acuity compared to best post-operative visual acuity, coupled with the presence of PCO detected on dilated slit lamp examination.

Total 1099 eyes of 950 patients were included in the study. These eyes have undergone anterior capsular polishing after phacoemulsification. The control group included 981 eyes of 957 patients. In these patients anterior capsular polishing was not done. The records of patients were reviewed for post-operative visual acuity, incidence of posterior capsular opacification.

Inclusion criteria

(1) Patients in the age group of 45–65 years.
(2) Patients with uncomplicated senile cataract.
(3) Patients without any systemic or ocular morbidity.
(4) Patients with well dilating pupils.

Exclusion criteria

(1) Patients with complicated cataract.
(2) Patients having corneal pathology.
(3) Patients with any form of ocular inflammation.
(4) Patients with glaucoma, retinal pathologies.
(5) Patients with traumatic cataracts, subluxated and dislocated lens, prior h/o ocular surgery, pseudoexfoliation.
(6) Patients with high refractive error, diabetes mellitus, steroid intake.
(7) Intra-operative not achieving the total anterior capsule cover on the IOL optic, sulcus fixated IOL, and any intraoperative complications like posterior capsule rupture.

All patients were operated by conventional, peristaltic phacoemulsification using Diplomax II machine (no commercial interest). Post-operatively all patients were checked on
day 1, 1st week, 1st month and at the end of 1 year. On every follow-up all patients were examined for UCVA, BCVA, and thorough slit-lamp examination. Appearance of PCO at the end of 1 year was recorded. PCO grading was done on slit-lamp, subjective assessment of PCO as well as Digitalised retro illumination image of PCO (Automated image analysis software AQUA) was done.

**Results and discussion**

The study included 1009 eyes of 950 patients who underwent phacoemulsification with foldable square edge hydrophilic IOL in the bag implantation with anterior capsular polishing. The control group included 981 eyes of 957 patients in whom anterior capsular polishing was not done. Of the 1009 eyes in which ant capsular polishing was done 8 eyes developed PCO (6 Elschnigs pearl type and 2 fibrotic type) at the end of 1 year, whereas none of the patients in this group had ACO. Whereas in the control group where AC polishing was not done 9 eyes (6 Elschnigs pearl type and 3 fibrotic type) developed PCO and 960 eyes developed ACO. Using Chi-square test and paired t-test it was found out that there was no statistically significant difference (p > 0.005) in the PCO formation in the test group and control group, whereas there was a difference in ant capsular opacification and capsular phimosis in the group where AC polishing was not done (p < 0.005).

Matthias Wirtitsch, MD, and Rupert Menapace, MD conducted the prospective, randomized study with colleagues at the University of Vienna, Austria. In the study, patients underwent bilateral cataract surgery and implantation of round-edge silicone IOLs, with the anterior capsule of one eye of each patient polished before IOL implantation. This study shows that anterior capsule polishing does not prevent formation of PCO and might even allow for more regeneratory cataract. In cases with excessive propensity for rhexis contraction, such as myotonic dystrophy, anterior capsule polishing may be advisable because it offers some advantages that may outweigh the disadvantage of edge barrier failure.

Although there were no significant differences in PCO rates between polished and unpolished eyes, Dr. Wirtitsch said polishing of the anterior capsule may have caused more regeneratory PCO due to decreased anterior capsular fibrosis. He said anterior capsule fibrosis is needed to maintain a permanent seal between the anterior and posterior capsule along the edge of the IOL optic.

Matthias Bolz, MD, Rupert Menapace, MD, Oliver Findl, MD conducted a study to evaluate the long-term effects of anterior capsule polishing on regeneratory posterior capsule opacification (PCO), anterior capsule opacification (ACO), and fibrotic PCO with a silicone intraocular lens (IOL) with sharp optic edges and concluded that eyes in which the anterior capsule had been polished had significantly less ACO. However, polishing did not lower PCO intensity when a sharp-edged CeeOn 911A IOL was implanted in the bag. Although results indicate that anterior capsule polishing may enhance the development of regeneratory PCO, this trend did not reach statistical significance.

**References**

