

Incidence of posterior capsule opacification following phacoemulsification in patients with uveitis

Samir S. Shoughy¹, Mahmoud O. Jaroudi¹, Khalid F. Tabbara^{1,2}

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Abstract:

PURPOSE: The purpose of this study was to evaluate the incidence of posterior capsule opacification (PCO) in patients with inactive uveitis who underwent phacoemulsification with acrylic hydrophobic intraocular lens.

METHODS: This was a retrospective review of 25 consecutive patients (31 eyes) with uveitis who underwent phacoemulsification. A group of 100 patients (140 eyes) without uveitis served as historical controls.

RESULTS: In patients with uveitis, PCO occurred in 11 eyes (35.5%), 6 (19%) of which were visually significant and required treatment with neodymium-doped yttrium aluminum garnet (Nd: YAG) laser. In the control group, PCO developed in 17 (12%) eyes which required treatment with Nd: YAG laser. The incidence of PCO was significantly higher in uveitis patients compared to the control group ($P = 0.001$), but the incidence of visually significant PCO requiring laser capsulotomy was not statistically significant ($P = 0.3$).

CONCLUSION: The incidence of PCO in patients with uveitis was significantly higher than those without uveitis, but the need for Nd: YAG laser capsulotomy for visually significant PCO was not statistically significant.

Keywords:

Acrylic, cataract, phacoemulsification, posterior capsule opacification, uveitis

INTRODUCTION

Posterior capsule opacification (PCO) is one of the major postoperative complications following cataract surgery. PCO may have severe impact on the quality of vision postoperatively. Visual problems associated with PCO include decrease in visual acuity, loss of contrast sensitivity, and glare. Furthermore, PCO may lead to significant impairment of fundus visualization with subsequent poor management of posterior segment disorders.^[1] PCO is a known postoperative complication in uveitic cataracts with variable incidence. The incidence of PCO in uveitic patients ranges from 23% to 96%, as previously reported.^[2] In this study, the incidence of PCO following phacoemulsification was assessed in a cohort of patients with inactive uveitis and compared to a historical control group without uveitis.

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METHODS

We reviewed retrospectively the medical records of 25 consecutive patients (31 eyes) with a history of uveitis who underwent phacoemulsification cataract surgery and posterior chamber intraocular lens (IOL) implantation. Procedures were performed between 2010 and 2013 at The Eye Center in Riyadh, Saudi Arabia. Age, gender, type of uveitis, type of IOL, postoperative development of posterior capsular opacification, and neodymium-doped yttrium aluminum garnet (Nd:YAG) laser capsulotomy were recorded. PCO was assessed subjectively by dilated slit-lamp examination. Nd:YAG laser capsulotomy was performed based on patient complaints of impaired vision and/or measurable decrease in vision compared to the best postoperative visual acuity.

The classification of uveitis was based on the standardization of uveitis nomenclature group.^[3] The inclusion criteria comprised patients with

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¹The Eye Center and the Eye Foundation for Research in Ophthalmology, ²Department of Ophthalmology, College of Medicine, King Saud University, Riyadh, Saudi Arabia

Address for correspondence:
Dr. Samir S. Shoughy,
The Eye Center and the Eye Foundation for Research in Ophthalmology, Riyadh, Saudi Arabia.
E-mail: samir.shawki@hotmail.com

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visually significant cataract or cataract impairing adequate funduscopy and a minimum period of 3 months with no clinical evidence of inflammation in the anterior chamber. We excluded patients with intraoperative complications such as posterior capsule rupture and nonacrylic IOL implantation.

Each patient received preoperative topical prednisolone acetate 1% and slowly tapered over 3 months postoperatively based on the degree of intraocular inflammation. Oral prednisolone was started as indicated and gradually tapered over 2–3 weeks postoperatively.

All cases were performed by the same surgeon. Phacoemulsification was carried out through a corneal temporal incision. Before surgery, phenylephrine 10% and tropicamide 1% eye drops were administered to all eyes. A 2.2-mm clear corneal incision was created. Synecholysis by viscoelastic substance was carried out, and manual iris dilatation using iris retractors was done in eyes that dilated poorly. A large anterior continuous curvilinear capsulorhexis was performed (around 6 mm). The lens nucleus was hydrodissected and removed by phacoemulsification and the cortical material by irrigation and aspiration. A posterior chamber acrylic intraocular lens was then inserted into the capsular bag, and the corneal wound was closed by hydration or 10-0 interrupted suture. All patients had acrylic hydrophobic IOL implantation. Subconjunctival injections of gentamicin and dexamethasone were given. Some patients received subconjunctival 10 mg of triamcinolone acetate at the conclusion of the procedure. The follow-up period ranged from 4 to 117 months, with a mean follow-up period of 50 months.

A control group of 100 consecutive patients (140 eyes) presenting for phacoemulsification during the same period at The Eye Center were included. Phacoemulsification was performed by the same surgeon using the same surgical techniques used for the study group. The follow-up period ranged from 1 to 96 months, with a mean follow-up period of 30 months.

Differences between the two groups were assessed using Chi-square test. $P < 0.05$ was considered statistically significant. The protocol was approved by the Institution Review Board of The Eye Center, Riyadh, Saudi Arabia. The study design complies with the standards put forth by the Declaration of Helsinki.

RESULTS

Twenty-five patients (31 eyes) with inactive uveitis and a minimum period of 3 months without ocular inflammation were included in the study. There were 9 male and 16 female patients with a mean age of 50 years (range: 26–72 years). The average follow-up period was 50 months (range: 4–117 months). Four out of the 25 patients had diabetes mellitus. Causes of uveitis included idiopathic anterior nongranulomatous uveitis in 7 (28%) patients, idiopathic anterior granulomatous uveitis in 2 (8%) patients, intermediate uveitis in 2 (8%) patients and idiopathic panuveitis in 1 (4%) patient, Vogt–Koyanagi–Harada (VKH) syndrome in 6 (25%) patients, presumed ocular tuberculosis in 1 patient, presumed viral etiology in 3 (12%) patients (herpes simplex virus in 2 [8%] patients and varicella-zoster virus in 1 [4%] patient), and Fuchs' uveitis syndrome in 3 (12%) patients [Table 1]. Posterior capsular opacification occurred in 11 eyes (35.5%), 6 (19%) of which were visually significant and required treatment with Nd: YAG laser. None of the diabetic patients developed PCO.

In the control group, 100 patients (140 eyes) without uveitis were included. There were 46 male and 54 female patients with a mean age of 62 years (range: 29–85 years). The average follow-up period was 30 months (range: 1–96 months). Forty-six out of the 100 patients had diabetes mellitus. In this group, PCO developed in 17 (11%) eyes, which all required treatment with Nd: YAG laser. Among the 17 patients who developed PCO, 9 were diabetics and 8 were nondiabetics.

DISCUSSION

PCO is a major complication of successful cataract surgery. PCO results from the proliferation, growth, migration, and differentiation of residual lens epithelial cells in the capsular bag following cataract surgery.^[4] Several factors may contribute to the formation of PCO. Surgical techniques including continuous curvilinear capsulorhexis, cortical removal, posterior capsule polishing, and lens placement in the capsular bag may contribute to the incidence of PCO. Young age, female gender, diabetes, and uveitis may increase the incidence of PCO formation. Intraocular lens (IOL) shape, biomaterial, and size of IOL may also contribute to PCO formation.^[5,6]

Table 1: Causes of uveitis

Diagnosis	Number of patients	Number of affected eyes	PCO	YAG cap
Anterior nongranulomatous uveitis	7	8	1	1
Idiopathic anterior granulomatous uveitis	2	3	0	0
Intermediate uveitis	2	3	2	1
Panuveitis	1	1	1	1
Vogt-Koyanagi-Harada syndrome	6	9	6	3
Fuchs' heterochromic iridocyclitis	3	3	1	0
Presumed ocular tuberculosis	1	1	0	0
Herpes simplex	2	2	0	0
Varicella-zoster virus	1	1	0	0

PCO=Posterior capsule opacification

Table 2: Incidence of posterior capsule opacification in previous studies

Sources	Year	Number of eyes	PCO (%)
Estafanous <i>et al.</i> ^[8]	2001	32	62
Kawaguchi <i>et al.</i> ^[7]	2007	95	23.7
Yamane <i>et al.</i> ^[9]	2007	189	19
Ram <i>et al.</i> ^[10]	2010	81	28.7
Lin <i>et al.</i> ^[6]	2014	84	28.6
Bhargava <i>et al.</i> ^[11]	2015	66	16.7
Current study	2020	31	35.5

PCO=Posterior capsule opacification

The reported incidence of PCO following cataract surgery in patients without uveitis is widely variable ranging from 15% to 50%. The incidence of PCO formation in patients with uveitis ranges from 23% to 96%.^[2,4] In our patients, PCO occurred in 11 eyes (35.5%), 6 (19%) of which were visually significant and required treatment with Nd: YAG laser. All our patients had acrylic hydrophobic IOL implantation. Previous studies have demonstrated different incidence rates following cataract extraction in patients with uveitis [Table 2].^[6-13] This variation of incidence could be explained by the variation in the follow-up period, the surgical techniques, and the type of IOLs.

In the control group, PCO developed in 17 eyes (12%), which all required treatment with Nd: YAG laser. The incidence of PCO was significantly higher in uveitis patients compared to the control group ($P = 0.001$), but the need for laser capsulotomy was not statistically significant ($P = 0.3$).

The choice of the proper type of IOL is important to decrease the incidence of PCO. Acrylic hydrophobic IOLs are associated with less significant risk of developing PCO than the acrylic hydrophilic IOLs.^[14] Similarly, the incidence of PCO was found to be significantly lower with sharp-edged IOLs compared to round-edged IOLs.^[15] On the other hand, data concerning the use of three-piece and single-piece acrylic hydrophobic lenses are variable. In some studies, it was found that PCO rates were not different significantly between 1-piece and 3-piece IOLs.^[16,17] However, some other studies showed a greater incidence of Nd: YAG capsulotomy in patients who receive one-piece acrylic lenses when compared to those who had three-piece acrylic lenses.^[5,18]

Patient variables, such as younger age, female sex, and diabetes, may increase the incidence of PCO formation.^[5] In our study, the incidence of PCO was slightly higher in female patients in both the groups. In the control group, PCO occurred in 16 patients (17 eyes), where PCO was found in 7 eyes of male patients and 10 eyes of female patients, while among the eleven eyes with PCO in the uveitis group, 3 eyes were for male patients and 8 eyes were for female patients. Regarding diabetic status, among the 17 eyes with PCO, 9 eyes belonged to diabetic patients and 8 eyes were for nondiabetic patients. In the uveitis group, there were 4 diabetic patients. None of them developed PCO. Among the different causes of uveitis, PCO occurred more in patients with VKH followed by intermediate uveitis.

In conclusion, the incidence of PCO in patients with uveitis was significantly higher than those without uveitis, but the need for Nd:YAG laser capsulotomy for visually significant PCO was not statistically significant. In the control group, the incidence of PCO was slightly higher in female patients compared to male patients and was almost the same among diabetic and nondiabetic patients, while in the uveitis group, the incidence of PCO was similarly slightly higher in females compared to males, but none of the four diabetic patients developed PCO.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Jorge Pde A, Jorge D, Ventura CV, Ventura BV, Lira W, Ventura MC, *et al.* Incidence of posterior capsule opacification following the implantation of a foldable hydrophilic acrylic intraocular lens: A 4 year follow-up study. *Arq Bras Oftalmol* 2014;77:222-4.
- Baheti U, Siddique SS, Foster CS. Cataract surgery in patients with history of uveitis. *Saudi J Ophthalmol* 2012;26:55-60.
- Jabs DA, Nussenblatt RB, Rosenbaum JT. Standardization of Uveitis Nomenclature (SUN) Working Group. Standardization of uveitis nomenclature for reporting clinical data: results of the First International Workshop. *Am J Ophthalmol* 2005;140:509-16.
- Apple DJ, Solomon KD, Tetz MR, Assia EI, Holland EY, Legler UF, *et al.* Posterior capsule opacification. *Surv Ophthalmol* 1992;37:73-116.
- Mian SI, Fahim K, Marcovitch A, Gada H, Musch DC, Sugar A, *et al.* Nd: YAG capsulotomy rates after use of the acrySof acrylic three piece and one piece intraocular lenses. *Br J Ophthalmol* 2005;89:1453-7.
- Lin CP, Yeh PT, Chen PF, Yang CM, Hu FR. Cataract extraction surgery in patients with uveitis in taiwan: Risk factors and outcomes. *J Formos Med Assoc* 2014;113:377-84.
- Kawaguchi T, Mochizuki M, Miyata K, Miyata N. Phacoemulsification cataract extraction and intraocular lens implantation in patients with uveitis. *J Cataract Refract Surg* 2007;33:305-9.
- Estafanous MF, Lowder CY, Meisler DM, Chauhan R. Phacoemulsification cataract extraction and posterior chamber lens implantation in patients with uveitis. *Am J Ophthalmol* 2001;131:620-5.
- Yamane Cde L, Vianna RN, Cardoso GP, Deschênes J, Burnier MN Jr. Cataract extraction using the phacoemulsification technique in patients with uveitis. *Arq Bras Oftalmol* 2007;70:683-8.
- Ram J, Gupta A, Kumar S, Kaushik S, Gupta N, Severia S. Phacoemulsification with intraocular lens implantation in patients with uveitis. *J Cataract Refract Surg* 2010;36:1283-8.
- Bhargava R, Kumar P, Sharma SK, Kumar M, Kaur A. Phacoemulsification versus small incision cataract surgery in patients with uveitis. *Int J Ophthalmol* 2015;8:965-70.
- Aaronson A, Grzybowski A, Tuuminen R. The health economic impact of posterior capsule opacification in finland comparing the two single-piece intraocular lenses: A cost-consequence analysis. *Acta Ophthalmol* 2019;97:e1152-3.
- Lindholm JM, Laine I, Tuuminen R. Five-year cumulative incidence and risk factors of Nd: YAG capsulotomy in 10 044 hydrophobic acrylic 1-piece and 3-piece intraocular lenses. *Am J Ophthalmol* 2019;200:218-23.
- Duman R, Karel F, Özyol P, Ateş C. Effect of four different intraocular lenses on posterior capsule opacification. *Int J Ophthalmol* 2015;8:118-21.

15. Findl O, Buehl W, Bauer P, Sycha T. Interventions for preventing posterior capsule opacification. *Cochrane Database Syst Rev* 2010;(2):CD003738.
16. Buehl W, Findl O. Effect of intraocular lens design on posterior capsule opacification. *J Cataract Refract Surg* 2008;34:1976-85.
17. Mencucci R, Favuzza E, Boccalini C, Gicquel JJ, Raimondi L. Square-edge intraocular lenses and epithelial lens cell proliferation: Implications on posterior capsule opacification in an *in vitro* model. *BMC Ophthalmol* 2015;15:5.
18. Wallin TR, Hinckley M, Nilson C, Olson RJ. A clinical comparison of single-piece and three-piece truncated hydrophobic acrylic intraocular lenses. *Am J Ophthalmol* 2003;136:614-9.