Incidence of posterior capsule opacification following phacoemulsification in patients with uveitis

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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: Thus 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.

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...
Posterior capsular opacification (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. 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.

### 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 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 results from the proliferation, growth, migration, and differentiation of residual lens epithelial cells in the capsular bag following cataract surgery. 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.

### 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 capsular 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 non-diabetic 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 non-diabetic 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.

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