EXTENDED REPORT

Outcome of phacoemulsification in patients with uveitis

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Aims: To examine the visual outcome and identify risk factors for postoperative uveitis, macular oedema and neodymium-doped yttrium aluminium garnet (Nd:YAG) capsulotomy after phacoemulsification and intraocular lens (IOL) implantation in patients with uveitis.

Method: This is a retrospective review of the medical records of 101 eyes of 101 patients. One eye was randomly selected for inclusion in patients who had bilateral surgery. Patients with juvenile arthritis, keratouveitis and lymphoma-associated uveitis were excluded.

Results: At the first postoperative and final visits, visual acuity was significantly better ($p < 0.001$), and 64.4% and 71.3% of patients, respectively, had achieved ≥ 2 Snellen's lines of visual improvement. The cumulative probability of doubling of the visual angle was 52% over 6 years of follow-up, and this occurred at a higher rate in the presence of preoperative retinal or optic nerve lesions (HR (95% CI) 4.49 (1.41 to 14.29)). Within 3 months after operation, uveitis was more likely to develop in female patients (OR (95% CI) 6.21 (1.41 to 27.43)) and in the presence of significant intraoperative posterior synechiae (OR (95% CI) 8.43 (1.09 to 65.41)); macular oedema was more likely to develop in patients who developed postoperative uveitis (OR (95% CI) 7.45 (1.63 to 34.16)). Nd:YAG capsulotomy occurred at a higher rate in patients aged ≤ 55 years (HR (95% CI) 2.28 (1.06, 4.93)) and in those with hydrogel IOLs (HR (95% CI) 3.71 (1.04 to 13.20)), and occurred at a lower rate in patients who had prophylactic systemic corticosteroids (HR (95% CI) 0.25 (0.11 to 0.59)), with plate-haptic silicone IOLs (HR (95% CI) 0.23 (0.08 to 0.64)) and three-piece silicone IOLs (HR (95% CI) 0.19 (0.05 to 0.74)) in comparison to those with polymethylmethacrylate IOLs.

Conclusion: Most patients with uveitis achieve improved visual acuity after phacoemulsification, but an increasing rate of visual loss is observed in those with pre-existent macular or optic nerve lesions. Identifying patients who are at risk of postoperative complications should help in patient counselling and to pre-empt these complications by using preoperative prophylactic corticosteroids, careful IOL selection and postoperative intensive corticosteroids.

Cataract occurs in up to 50% of patients with uveitis. In these patients, the visual outcome of cataract extraction can be unpredictable and can lead to a higher rate of postoperative inflammation, macular oedema^{1–8} and posterior capsular opacification (PCO)⁹ than in patients without uveitis.

Little is known about the factors that could affect the visual outcome or the development of postoperative complications. Several studies have established a relationship between factors such as age, race, gender and coexistent systemic diseases, and the long-term visual outcome in these patients.^{10–11} It is not known whether these factors can also affect the postoperative course and the long-term visual outcome after cataract extraction.

This retrospective study was carried out to examine the visual outcome after phacoemulsification in patients with uveitis, and the rate and risk factors for visual loss, development of postoperative uveitis, macular oedema and PCO.

MATERIALS AND METHODS

We reviewed the medical records of 156 patients with uveitis who had undergone phacoemulsification cataract surgery and intraocular lens (IOL) implantation at Moorfields Eye Hospital, Whipps Cross University Hospital (London, UK) the Royal Prince Alfred Hospital, or St Vincent's Hospital (Sydney, New South Wales, Australia) between 1996 and 2001. All three hospitals used similar protocols for perioperative management of patients with cataract and uveitis.

Inclusion and exclusion criteria

All patients with a minimum follow-up of 3 months ($n = 151$ eyes) were eligible for inclusion, but only the first eye of those

who underwent bilateral surgery ($n = 36$) was included. Patients with juvenile idiopathic arthritis who had lensectomy ($n = 2$), those with herpetic keratouveitis ($n = 4$) or lymphoma-associated uveitis ($n = 2$) and those who underwent phacotrabeculectomy ($n = 6$) were excluded. These patients either had different perioperative treatment regimens or had visual loss due to causes other than those related to uveitis.

Data retrieval

The data retrieved from the clinical notes included gender, age at surgery, type of uveitis, presence of a uveitis-associated systemic disease, surgical details and postoperative complications, and preoperative and postoperative best-corrected visual acuity (BCVA). The postoperative BCVA was taken at the first postoperative visit (within 48 h) and final visit. Snellen's acuity was converted into the log minimum angle of resolution (logMAR) equivalent for statistical analysis.

Diagnosis of uveitis and associated systemic and ocular diseases

The classification of uveitis diagnoses followed the International Uveitis Study Group classification of uveitis.¹² A total of 57 (56%) patients had anterior uveitis which comprised three subgroups: recurrent acute anterior uveitis ($n = 25$, 43.9%); chronic anterior uveitis ($n = 22$, 38.6%); and Fuchs'

Abbreviations: BCVA, best-corrected visual acuity; ERM, epiretinal membrane; IOL, intraocular lens; IOP, intraocular pressure; logMAR, log minimum angle of resolution; Nd:YAG, neodymium-doped yttrium aluminium garnet; PCO, posterior capsular opacification; PMMA, polymethylmethacrylate

heterochromic cyclitis ($n = 10$, 17.5%). A total of 44 (44%) patients had posterior uveitis which comprised two subgroups: intermediate uveitis ($n = 17$, 39%) and posterior uveitis ($n = 27$, 61%). The second subgroup included patients with choriorretinitis, retinal vasculitis or panuveitis.

Uveitis-associated systemic disease was present in 25 (24.8%) patients (table 1). Eight patients had diabetes mellitus but none of them had clinically significant retinopathy. One patient had had a trabeculectomy for chronic glaucoma 5 years before operation, and another had had pars plana vitrectomy for rhegmatogenous retinal detachment 18 months before operation.

Macular and/or optic nerve lesions were present in 21 (20.8%) patients. These included chronic cystoid macular oedema in 4 (19%) patients, epiretinal membrane (ERM) in 9 (42.9%), macular chorioretinal scar in 5 (23.8%), advanced glaucomatous optic neuropathy in 2 (9.5%) and disciform macular scar in 1 (4.7%).

Preoperative management

Preoperatively, the inflammation had been controlled for a minimum of 3 months. In all patients with chronic anterior uveitis and three with posterior uveitis, surgery was undertaken when the anterior chamber activity had been reduced by treatment to the lowest possible level. Patients with previously documented macular oedema, disease activity within the 3 months before operation or those with a poor outcome in the first eye due to macular oedema or postoperative uveitis were given systemic corticosteroids ($n = 58$, 57%) either orally, as 40 mg of prednisolone for 2 weeks before surgery ($n = 54$, 93.1%) or intravenously, as methyl-prednisolone 500 mg on the day of surgery ($n = 4$, 6.9%).

Phacoemulsification

Phacoemulsification was performed by a consultant or a fellow ($n = 81$, 80.2%) or a resident ($n = 20$, 19.8%) attached to the uveitis service. Manual pupillary dilatation was necessary in 7 (6.9%) patients who had significant posterior synechiae. That was carried out using either iris hooks ($n = 6$, 5.9%) or sphincterotomy ($n = 1$, 0.9%). Minimal hyphaema occurred in the latter case as well as in 3 (3.9%) patients with Fuchs' heterochromic cyclitis. Posterior capsular rupture occurred in 1 (0.9%) patient and required anterior vitrectomy.

One of five types of IOL was implanted inside the capsular bag: silicone, either plate-haptic (C10/11UB; Chiron, Bausch & Lomb, California, USA; $n = 32$, 31.7%) or three-piece model (SI30NB or SI40; Advanced Medical Optics or LI41U; Iolab, California, USA; $n = 15$, 14.8%); hydrophobic acrylic (Acrysof MA60U; Alcon Lab, Texas, USA; $n = 24$, 23.8%); polymethylmethacrylate (PMMA; MC550; Bausch & Lomb; $n = 21$, 20.8%); or hydrogel (Hydroview, H60M; Bausch & Lomb; $n = 9$, 8.9%). A hydrophobic acrylic IOL (Acrysof MA60U; Alcon Lab) was successfully placed within the remnants of the capsular bag in a patient who had had capsular rupture. Corneal sutures were required in 23 (23%) patients to secure either a large incision in those who had PMMA implants ($n = 21$) or a leaking wound ($n = 2$). Subconjunctival antibiotics (cefuroxime 125 mg or gentamicin 20 mg) and corticosteroids (betamethasone 4 mg) were injected at the end of the procedure.

Postoperative management

Patients were prescribed G dexamethasone 0.1% or G methyl-prednisolone acetate 1% and G chloramphenicol, gradually withdrawing over 4–6 weeks. All patients were reviewed within 48 h and subsequent visits were determined according to clinical need. Preoperative prophylactic oral prednisolone was gradually tapered and stopped over 8 weeks.

Two of the patients (1.9%) with sarcoidosis-related posterior uveitis required vitrectomy for persistent floaters and retinal detachment 1 and 4 years postoperatively.

Outcome and statistical analysis

The main outcomes were BCVA, the rate of doubling of the visual angle (loss of ≥ 3 logMAR lines) over the follow-up time, the development of uveitis or macular oedema within 3 months and the development of PCO that required neodymium-doped yttrium aluminium garnet (Nd:YAG) capsulotomy at any time during follow-up. The 3-month follow-up period was chosen as episodes of uveitis or macular oedema occurring at that time were more likely to be related to surgery than to the natural course of the disease.

Postoperative uveitis was defined clinically as any inflammatory episode within 3 months after surgery that required additional intensive topical or systemic anti-inflammatory or immunosuppressive treatment in the presence of symptoms of pain and anterior chamber flare and/or cells. Postoperative macular oedema was defined as the development of clinically or angiographically identifiable retinal thickening or cystoid macular oedema, especially if associated with symptoms of blurred vision or with reduced visual acuity and if it required systemic or orbital floor corticosteroid treatment within the same period. Later episodes of uveitis or macular oedema were termed "recurrent". PCO was considered clinically significant if it had led to symptoms of blurred vision or glare, reduced visual acuity or impaired posterior segment view and required Nd:YAG capsulotomy.

SPSS V.9 for Windows software was used for the statistical analysis. The paired t test was used to compare preoperative and postoperative visual acuity and survival table analysis was used to derive the cumulative probability of visual loss during the follow-up time. Logrank and χ^2 tests were used to identify potential risk factors, and multivariate backward regression models were constructed to identify the independent factors associated with the outcome of interest. A variable was included in the multivariate model if it had a p value of <0.2 on the bivariate analysis or if known from previous studies to affect the outcome of interest. A p value of <0.05 was considered significant.

RESULTS

Patient characteristics

Table 1 lists the demographic and clinical features of the patients. In all, 101 eyes of 101 patients were included; 43 (43%) patients were male. The mean (range) age of the patients was 52.8 (14.1–88.2) years and the mean (range) follow-up time was 23.4 (3–79.5) months.

Visual outcome

A significant improvement in the mean logMAR BCVA was observed at the first postoperative (within 48 h of surgery) and final visits ($p < 0.001$; fig 1). At the first postoperative visit, 65 (64.4%) patients had ≥ 2 Snellen's lines of visual improvement, with 58 (57.5%) having 6/12 or better. At the final visit, 72 (71.3%) patients had ≥ 2 lines of visual improvement, with 78 (77.2%) having 6/12 or better.

Over the 6 years of follow-up, the cumulative probability of survival for the achieved postoperative acuity (avoiding loss of one line or doubling of visual angle) steadily decreased. By the end of the follow-up time, the probability of doubling of the visual angle was 52% (table 2 and fig 2). A Cox multivariate analysis model (table 3) identified preoperative macular or optic nerve lesions as independently associated with increased rate of doubling of the visual angle over the follow-up time (HR (95% CI) 4.49 (1.41 to 14.29); $p = 0.01$).

Table 1 Patient characteristics

n	101
Age at surgery (years)	
Mean (SD)	52.8 (15.6)
Range	14.1–88.2
M:F	43 (42.6%):58 (57.4%)
Ethnic origin, n (%)	
Caucasian	67 (66.3)
Asian	13 (12.9)
Afro-Caribbean	10 (9.9)
Others	11 (10.9)
Uveitis diagnosis, n (%)	
Anterior	57 (56.4)
Posterior	44 (43.6)
DM	8 (7.9)
Uveitis-associated systemic disease, n (%)	
Sarcoidosis	6 (5.9)
Toxoplasmosis	5 (5)
VKH syndrome	3 (3)
Ankylosing spondylitis	3 (3)
Crohn's disease	2 (2)
Ulcerative colitis	1 (1)
Reiter's disease	2 (2)
Behçet's disease	2 (2)
TB	1 (1)
IOL types, n (%)	
PH silicone	32 (31.7)
3-piece silicone	15 (14.9)
Acrylic	24 (23.8)
Hydrogel	9 (8.9)
PMMA	21 (20.8)
Follow-up (months)	
Mean (SD)	23.4 (18)
Range	3–79.5

DM, diabetes mellitus; F, female; IOL, intraocular lens; M, male; PH, plate-haptic; PMMA, polymethylmethacrylate; TB, tuberculosis; VKH, Vogt–Koyanagi–Harada.

Postoperative uveitis

Recurrence of uveitis occurred in 22 (21.8%) patients during the postoperative follow-up period. In all, 15 (68.2%) patients presented with postoperative uveitis (ie, within 3 months) and the time to presentation ranged between 2 and 87 days (median 14 days). A multivariate logistic model revealed that female gender (OR (95% CI) 6.21 (1.41 to 27.43)) and the presence of synechiae (OR (95% CI) 8.43 (1.09 to 65.41)) were

Figure 1 Error bar chart of the preoperative, postoperative and final best-corrected visual acuity. Each error bar represents the mean visual acuity (the mid-point) and the CI. It shows significantly improved visual acuity at the postoperative (Postop) and final visit. Preop, preoperative.

independently associated with an increased likelihood of developing postoperative uveitis within 3 months (table 4).

Treatment of postoperative uveitis included either intensive topical corticosteroids (dexamethasone 0.1% or prednisolone acetate 1%; n = 10, 45.5%), periocular injection of methylprednisolone 40 mg or triamcinolone 40 mg (n = 5, 22.7%), oral prednisolone (40–80 mg; n = 7, 31.8%) or a combination of both periocular and oral corticosteroids (n = 5, 22.7%). Azathioprine was added to the corticosteroids in a patient with Behçet's disease (4.5%) and intracameral injection of recombinant tissue plasminogen activator was given to 3 (13.6%) patients with fibrinous anterior uveitis.

Macular oedema

Macular oedema developed in 21 (20.8%) patients, 8 (38.1%) of whom presented within 3 months; the time to presentation ranged between 9 and 51 days (median 29 days). A multivariate logistic model revealed that patients who developed postoperative uveitis within 3 months were more likely to have macular oedema (OR (95% CI) 7.45 (1.63 to 34.16); table 4).

Macular oedema was treated with periocular (n = 10) or oral corticosteroids (n = 5) as above. Topical non-steroidal anti-inflammatory drugs and/or oral acetazolamide were also used in four patients. Two patients with macular thickening diagnosed clinically without concurrent uveitis and no change in visual acuity were followed up conservatively and showed spontaneous resolution of the macular thickening within 6 weeks.

PCO and Nd:YAG capsulotomy

PCO was the most common complication during the follow-up period, occurring in 39 (38.6%) patients, 33 (84.6%) of whom required Nd:YAG capsulotomy. The time to capsulotomy ranged from 1.5 to 42.3 months (median 10.8 months). A Cox multivariate regression model revealed that capsulotomy was required at a higher rate in patients aged ≤ 55 years and in patients who had hydrogel IOLs (HR (95% CI) 3.74 (1.05 to 13.33)), and at a lower rate in patients who had plate-haptic silicone (HR (95% CI) 0.23 (0.08 to 0.62)) and three-piece silicone IOLs (HR (95% CI) 0.18 (0.05 to 0.71)) and in those who were given prophylactic systemic corticosteroids preoperatively (HR (95% CI) 0.24 (0.11 to 0.60); table 5). Within 3 months of Nd:YAG capsulotomy, 1 (3%) patient developed macular oedema and was treated with periocular injection of dexamethasone 40 mg.

Other complications

Early rise in intraocular pressure

Rise in intraocular pressure (IOP) requiring treatment occurred within the first 2 days in 6 (5.9%) patients. Four of these patients were treated with acetazolamide + topical β -blocking agents for 2–7 days. One patient, who was on topical treatment for glaucoma before operation, needed trabeculectomy 6 weeks later for uncontrolled IOP. Another patient had a persistent rise in IOP secondary to anterior uveitis due to residual cortical lens matter that required removal 1 week after surgery and resulted in the resolution of the increased IOP.

Epiretinal membrane

A macular ERM was noted in a total of 17 (16.8%) patients, including 8 (7.9%) patients in whom it was noted for the first time during the follow-up period.

Anterior lens deposits

In all, 3 (3%) patients developed significant deposits on the anterior lens surface that were removed with Nd:YAG laser. All the patients had plate-haptic silicone IOLs and developed

Table 2 Survival table of the probability of maintaining visual acuity over the follow-up time

Time interval (months)	Patients (n)	Patients lost to follow-up (n)	Number of patients experiencing				Cumulative probability of survival† for	
			Loss of ≥ 1 line	Doubling of visual angle*	Loss of ≥ 1 line (SE)	Doubling of visual angle* (SE)	Loss of ≥ 1 line (SE)	Doubling of visual angle* (SE)
0–6	101	13	0	0	100 (0.00)	100 (0.00)	100 (0.00)	100 (0.00)
6–12	88	18	2	1	97 (0.02)	99 (0.01)	97 (0.02)	99 (0.01)
12–18	69	14	6	4	88 (0.04)	92 (0.03)	88 (0.04)	92 (0.03)
18–24	51	9	1	1	86 (0.04)	90 (0.04)	86 (0.04)	90 (0.04)
24–30	41	10	4	3	77 (0.06)	83 (0.05)	77 (0.06)	83 (0.05)
30–36	28	6	0	0	77 (0.06)	83 (0.07)	77 (0.06)	83 (0.07)
36–42	22	5	2	2	69 (0.07)	74 (0.07)	69 (0.07)	74 (0.07)
42–48	15	4	0	0	69 (0.07)	74 (0.07)	69 (0.07)	74 (0.07)
48–54	11	3	1	1	62 (0.10)	67 (0.10)	62 (0.10)	67 (0.10)
54–60	7	1	0	0	62 (0.10)	67 (0.10)	62 (0.10)	67 (0.10)
60–66	6	1	0	0	62 (0.10)	67 (0.10)	62 (0.10)	67 (0.10)
66–72	5	3	1	1	44 (0.16)	48 (0.18)	44 (0.16)	48 (0.18)

*Loss of ≥ 3 lines.†This is the probability of avoiding any loss of ≥ 1 line of visual acuity or doubling of visual angle by the end of the respective interval, taking into account the probability of avoiding the same visual loss in the previous interval. **Figure 2** Kaplan-Meier curve of the cumulative (Cum) probability of survival for doubling of visual angle (avoiding doubling of the visual angle) over the follow-up time.

postoperative uveitis within 3 months. The procedure was uneventful and led to 1–2 lines of visual improvement in two of them.

DISCUSSION

In this study, we found that phacoemulsification in patients with uveitis led to a significant improvement in BCVA ($p < 0.001$). This is in agreement with other studies that

reported short- and long-term visual improvement of ≥ 2 lines in up to 93% of patients.^{4–6, 13} Survival table analysis showed, however, that over 6 years of follow-up, the cumulative probability of experiencing doubling of the visual angle was 52% (table 2 and fig 2), and multivariate analysis showed that the presence of preoperative macular or optic nerve lesions was an independent predictor for increased rate of this visual loss (table 3).

Postoperative complications included postoperative uveitis (21.8%), macular oedema (20.8%), posterior capsule opacification (38.6%), ERM (7.9%), early rise in IOP (5.9%) and IOL deposits (3%). Estafanous *et al.*,⁵ in a retrospective study of 32 patients with an average follow-up of 20 months, reported recurrence of uveitis in 41%, macular oedema in 15%, ERM in 15% and PCO in 62% of patients. In another study by Suresh and Jones,⁶ a similar prevalence of postoperative uveitis (36%) but lower prevalence of macular oedema (2%) was reported during an average follow-up of 24.1 months. The differences in the prevalence of complications between our study and these studies may be related to differences in the definition of complications or in the patient populations. The reported prevalence of these complications is higher in studies on extracapsular cataract extraction than in this study. Krishna *et al.*² showed that postoperative uveitis, macular oedema and PCO occurred in 53%, 56% and 58% of patients, respectively, over a mean follow-up of 81.4 months. Although the longer follow-up might have contributed to the larger percentages in that study, Okhravi *et al.*³ reported 34%, 20% and 32% of postoperative uveitis, macular oedema and PCO, respectively, over a shorter period of follow-up (mean 10.2 months). The smaller incision and reduced uveal trauma in phacoemulsification are known to decrease early postoperative inflammation¹⁴ and to induce less blood–aqueous barrier damage,^{15–19} both of which are linked to the development of macular oedema.²⁰ Also, the improved cortical lens matter removal and the use of more biocompatible, better designed IOLs are important factors in reducing the PCO rate with phacoemulsification.^{15–17, 21–22}

Multivariate analysis (table 4) revealed that female gender and the presence of significant synechiae were associated with the development of postoperative uveitis within 3 months. Although the relationship between gender and the development of postoperative uveitis was not clear, the relationship to the presence of significant posterior synechiae was hardly surprising. Previous studies have established that uveal trauma stimulates the release of prostaglandins, which elicit a uveal

Table 3 Cox multivariate regression analysis of the factors associated with doubling of the visual angle over the follow-up time

Preoperative macular or optic nerve lesion	Doubling of the visual angle		
	HR	95% CI	p Value
No	Reference		
Yes	4.49	1.41 to 14.29	0.01

Covariates included patient ethnicity, type of uveitis (anterior vs posterior), use of prophylactic systemic corticosteroids and development of uveitis or macular oedema.

Table 4 Logistic regression analysis of the factors affecting the development of postoperative uveitis and macular oedema within 3 months

	OR	95% CI	p Value
Postoperative uveitis within 3 months*			
Gender			
Male	Reference		
Female	6.21	1.41 to 27.43	0.02
Presence of synechia†			
No	Reference		
Yes	8.43	1.09 to 65.41	0.04
IOL type			
PMMA IOL	Reference		
PH silicone IOL	16 872	0.00 to 6.82×10^{33}	0.78
3-piece silicone IOL	5063	0.00 to 2.07×10^{33}	0.81
Hydrophobic acrylic IOL	3249	0.00 to 1.32×10^{33}	0.82
Hydrogel IOL	0.50	0.00 to 1.59×10^{52}	0.99
Postoperative macular oedema within 3 months‡			
Postoperative uveitis within 3 months			
No	Reference		
Yes	7.45	1.63 to 34.16	0.01

IOL, intraocular lens; IOP, intraocular pressure; PH, plate-haptic; PMMA, polymethylmethacrylate.

*Covariates included the uveitis type (anterior vs posterior), the presence of diabetes mellitus, the type of IOL and the use of corneal sutures.

†Significant synechia—that is, those that required manual dilatation with iris hooks or sphincterotomy.

‡Covariates included gender and diabetes mellitus.

inflammatory response.²³ Also, there was a significant association between the development of postoperative uveitis and the development of macular oedema, which has been suggested in other studies in patients with and without uveitis.^{3–20} This suggests that preoperative prophylactic or postoperative intensive topical anti-inflammatory medications should be liberally used in patients at risk for, or those who actually develop, postoperative inflammation to ensure adequate control of any postoperative inflammation and, therefore, perhaps reduce the risk of developing macular oedema.

In all, 33 (32.7%) of our patients underwent Nd:YAG capsulotomy for clinically significant PCO. The independent factors associated with increased rate of Nd:YAG capsulotomy during the follow-up period (table 5) were age ≤ 55 years and hydrogel IOLs; whereas plate-haptic and three-piece silicone IOLs, as compared with PMMA IOLs, and the use of prophylactic corticosteroids were associated with a decreased rate.

The increased risk of Nd:YAG capsulotomy in association with hydrogel implants has been shown before in patients with²⁴ and without uveitis,^{25–26} and has been ascribed to its increased water content (18–30%) in contrast to hydrophobic acrylic (<2%), silicone and PMMA implants (both <1%).^{27–28}

However, although plate-haptic silicone IOLs were associated with a reduced risk of Nd:YAG capsulotomy in contrast to PMMA, three patients developed visually significant deposits on the anterior lens surface that required Nd:YAG laser treatment. Previous studies have also found that these implants were associated with an increased frequency of anterior capsular contraction and IOL subluxation.^{29–33} Also, the increased affinity of silicone implants to adhere to silicone oil³⁴ makes its material generally less favourable in patients with uveitis. Although we could not identify any significant effect in relation to hydrophobic acrylic IOLs, a recent randomised trial¹³ showed that they had better postoperative inflammatory indices and lower PCO in patients with uveitis.

The effect of prophylactic corticosteroids in reducing the PCO rate has not been shown previously. This effect may be related to the inhibitory action of corticosteroids on lens epithelial cell proliferation as shown in in vitro studies^{35–36} or to an indirect effect through inhibition of the uveal inflammatory response.⁷

The results of this study should be carefully interpreted in light of its design and patient population. In retrospective studies, potential bias cannot always be completely eliminated, but by including all possible preoperative and surgery-related covariates in the multivariate analysis, we believe that the bias

Table 5 Cox multivariate regression analysis of the factors affecting the rate of neodymium-doped yttrium aluminium garnet capsulotomy

	HR	95% CI	p Value
Age (years)			
>55	Reference		
≤ 55	2.28	1.06 to 4.93	0.04
Prophylactic systemic corticosteroids			
No	Reference		
Yes	0.25	0.11 to 0.59	0.002
IOL			
PMMA	Reference		
PH silicone	0.23	0.08 to 0.64	0.005
3-piece silicone	0.19	0.05 to 0.74	0.02
Hydrophobic acrylic	0.74	0.25 to 2.23	0.60
Hydrogel	3.71	1.04 to 13.20	0.04

IOL, intraocular lens; PH, plate-haptic; PMMA, polymethylmethacrylate.

Covariates included: gender, ethnic origin, uveitis type (anterior vs posterior), the presence of uveitis-associated systemic disease, surgeon's grade, the presence of significant posterior synechia and postoperative/recurrent uveitis.

was significantly reduced. The three units in this study are tertiary referral units whose patient population is usually skewed towards those with more severe forms of uveitis and those with more uveitis-related vision-threatening complications. Therefore, the results are likely to be even better in secondary or community-based eye centres.

In conclusion, our study highlighted some of the outcome features of phacoemulsification in patients with uveitis, which should help in patient counselling and in planning their perioperative management. Although most patients achieve significant visual improvement, there seems to be a tendency for visual loss over the follow-up time, especially in patients with pre-existent macular or optic nerve lesions. Identifying patients who are at risk for the development of postoperative complications and using a regimen of frequent follow-up, judicious use of either preoperative prophylactic or postoperative systemic or topical corticosteroids, and carefully selecting the IOL type should help minimise the incidence of complications and improve the overall outcome in these patients.

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