

# Postoperative Outcomes after Implantation of Intraocular Lenses in Eyes with Cataract and Uveitis

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## ABSTRACT

*Despite advances in surgical technique and implant materials, cataract surgery in patients with uveitis is still a challenging procedure. We retrospectively evaluated postoperative outcomes of cataract surgery in 35 eyes of 29 patients with uveitis. Phacoemulsification with posterior chamber intraocular lens implantation was performed in all eyes. Postoperative evaluations were performed at day 2, and then at 7 days, 1, 3, and 6 months respectively. There were 16 males, and 13 females, aged 31 to 68 years. Follow-up ranged from 4 to 35 months. At final follow-up 33 eyes (94%) had an improvement in visual acuity compared with preoperative levels ( $p < 0,05$ ). Giant cells were observed in the intraocular lens optic in 7 eyes (20%). Posterior capsule opacification occurred in 10 eyes (29%). Clinical cystoid macular edema was observed in 4 eyes, and 2 eyes required trabeculectomy with mitomycin C due to secondary glaucoma. Cataract surgery in patients with uveitis leads to successful visual results after correct surgical timing, and adequate anti-inflammatory therapy. There were no significant differences in the degree of inflammation after implantation of various types of intraocular lenses.*

**Key words:** *intraocular lenses, surgery, cataract, uveitis*

## Introduction

Cataract formation is a frequent complication in patients with uveitis. Its incidence can be as high as 50%<sup>1-2</sup>, resulting from recurrences of inflammation and steroid use. Cataract surgery in such patients presents many challenges due to the underlying systemic pathology<sup>3-5</sup>, chronic preoperative inflammation, and the development of complications. Because of those difficulties, cataract surgery in the past was performed either as intracapsular or extracapsular cataract extraction, without the implantation of an intraocular lens<sup>6</sup>. The issue of implantation of intraocular lenses in patients with uveitic cataracts was addressed differently by different authors. Some authors advocated that intraocular lenses were contraindicated in uveitic eyes, because they were thought to cause an inflammatory response<sup>7</sup>. On the contrary, other authors<sup>8</sup> published successful outcomes after cataract extraction and intraocular lens implantation in uveitic cataract.

Initially, due to technological restrictions, and concerns about postoperative complications, intraocular lenses were implanted only in carefully selected patients, such as those with Fuchs' heterochromic uveitis<sup>9-10</sup>. Later, with advances in surgical techniques of cataract extraction, particularly with the more widespread use of small incision phacoemulsification surgery, intraocular lenses were being implanted in patients with other types of uveitis as well<sup>11</sup>. Nowadays, there is a great choice of various intraocular lenses available on the market. The proper choice of intraocular lens regarding its material and design is important for the postoperative outcome. To date, few studies have addressed the safety and efficacy of implanting posterior chamber intraocular lens of various materials in uveitic eyes, with different outcomes<sup>12-14</sup>.

This retrospective study reports postoperative outcomes after cataract extraction and posterior chamber

implantation of three different types of intraocular lenses in patients with uveitis.

## Patients and Methods

We retrospectively reviewed 29 charts of uveitis patients who had cataract surgery and intraocular lens implantation at the Eye Clinic, University Hospital »Sestre milosrdnice« from January 2001 to December 2003. There were 16 men (19 eyes), and 13 women (16 eyes), with a median age at the time of surgery of 41 years (range 31–68 years). The median follow up was 21 months (range 4–35 months). Most patients were diagnosed as having an idiopathic chronic uveitis (12 patients), with the second largest group having Fuchs' heterochromic uveitis (8 patients). Other diagnoses of uveitis included ankylosing spondylitis (3 patients), rheumatoid arthritis (5 patients), and sarcoidosis (1 patient). Anterior uveitis was found in 16 eyes (46%), intermediate in eyes (20%), posterior in 3 (9%), and panuveitis in 9 eyes (25%). The most common associated ocular pathology was the presence of posterior synechia, which was found in 29 eyes. Other, less common ocular findings included pupillary membranes (3 eyes), cystoid macular edema (3 eyes), and iris neovascularization (2 eyes). Glaucoma was present in 8 eyes, and was managed with topical medications in 6 eyes. Three of those eyes have also undergone a YAG laser iridotomy. Two eyes required trabeculectomy due to uncontrollable glaucoma. The indications for a cataract surgery were the reduction of visual acuity and/or the need for fundus monitoring. Preoperatively, uveitis had to be quiescent for a minimum of three months, with no signs of active inflammation (noted by Uveitis Scoring System as grade 0 for anterior chamber cells and grade 1 or less for flare). Preoperative anti-inflammatory treatment was adjusted individually (Table 1).

TABLE 1  
PREOPERATIVE ANTIINFLAMMATORY TREATMENT

Preoperative anti-inflammatory treatment	Number of patients	Percentage (%)
None	8	23
Topical steroids only	13	37
Oral steroids only	6	17
Topical and oral steroids	7	20

All patients were operated on by the same surgeon (Z.M.) in peribulbar anesthesia. Pupils were dilated with a combination of 2.5% phenylephrine (2.5% Neosynephrine; Sanofi-Aventis, Strassbourg, France), and 1% tropicamide (1% Mydracyl; Alcon Laboratories, Hemel Hempstead, UK) eye drops. Anterior chamber was accessed either by a scleral tunnel approach, or by a clear cornea incision. In cases of an inadequately dilating pupil, due to posterior synechia, synechiolysis with a needle, or iris stretching with Beehler pupil stretcher (Rhein Medical Inc., Tampa, Fla., USA), or a viscoelastic

(Healon GV, Pharmacia, Uppsala, Sweden) were utilized accordingly. Careful anterior continuous curvilinear capsulorhexis was then performed, followed by phacoemulsification of the lens nucleus, irrigation and aspiration of cortical lens material. Posterior chamber intraocular lens was implanted in all patients. In 19 eyes (55%) we implanted a foldable acrylic intraocular lens (Acrysof MA60BM, Alcon, Forth Worth, TX, USA), in 11 eyes (31%) a foldable silicone intraocular lens (Allergan SI40, Allergan Inc, Irvine, CA, USA), and in 5 eyes (14%) a heparin-surface-modified poly(methyl methacrylate) (HSM PMMA) IOL 809C (Pharmacia & Upjohn, Uppsala, Sweden).

Subconjunctival injections of dexamethasone were given at the end of surgery. Postoperatively, the degree of intraocular inflammation was controlled with topical antibiotics and corticosteroids, subconjunctival corticosteroid injections, and if necessary, with systemic corticosteroids. Postoperative evaluations were performed at day 2, and then at 7 days, 1, 3, and 6 months respectively. Ocular examination, slitlamp biomicroscopy, and fundus examination were done in all cases, noting early, as well as late postoperative complications (recurrence of inflammation, raised intraocular pressure, cystoid macular edema, giant cell deposits, and posterior capsule opacification).

Data were presented as median and range. Difference in preoperative and postoperative visual acuity was tested with Wilcoxon Signed Rank Test. Difference in the giant cell deposits on different types of intraocular lens was tested with Fisher's Exact Test. P value of less than 0.05 was taken as statistically significant.

## Results

We analyzed 29 patients and 35 eyes. The patients were followed for a minimum of 4, and a maximum of 35 months. We encountered following intraoperative complications: zonular dehiscence in 2 eyes, posterior capsule tear in 3 eyes, anterior chamber bleeding in 2 eyes, iris damage in 3 eyes and filliform haemorrhage in 3 eyes. Despite those intraoperative complications, we managed to implant an intraocular lens in the posterior chamber in all eyes. Average preoperative visual acuity was 0.15 (range 0.025 to 0.5), and average postoperative visual acuity was 0.6 (range 0.05 to 1.0). 94% percent of patients showed an improvement in visual acuity, while 79% of them had a visual acuity of 0.5 or better. The difference in preoperative versus postoperative visual acuity was statistically significant ( $p=0.002$ ). The most common complication in the early postoperative period was the recurrence of inflammation, which was noted in 8 eyes (23%), followed by raised intraocular pressure (6 eyes, 17%), and cystoid macular edema (4 eyes, 11%). In the late postoperative period, posterior capsule opacification occurred in 10 eyes (29%), followed by posterior synechia (5 eyes, 14%). Other less common complications included secondary glaucoma in two and epiretinal membrane formation in one patient. Giant cell deposits

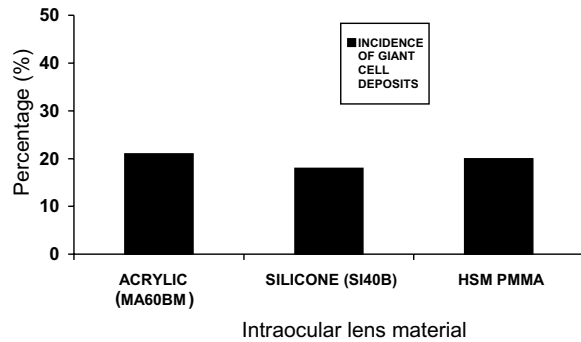


Fig. 1. Incidence of giant cell deposits on different types of intraocular lenses.

were found in 4 eyes with an implanted acrylic intraocular lens, in 2 eyes with a silicone intraocular lens, and in one eye with a heparine surface modified PMMA intraocular lens. There were no statistically significant differences in the incidence of giant cell deposits (Figure 1.) among those three groups of intraocular lenses (Fisher's Exact Test,  $p=0.54$ ).

## Discussion

Our results showed that the primary outcome, postoperative best corrected visual acuity, improved in 94% of eyes, and that 79% reached a visual acuity of 0.5 or better. These results are comparable to other studies on cataract extraction in patients with uveitis. Estafanous et al.<sup>11</sup>, and Kang et al.<sup>15</sup> reported visual improvement in 95% and 96% of eyes, with final visual acuity of 0.5 or better in 87% and 64% of eyes respectively. Final visual acuity of less than 0.5 in our study was the result of chronic cystoid macular edema, epiretinal membrane formation, and secondary glaucoma. The most common complication after surgery was the recurrence of inflammation, which was seen in 8 eyes (23%). This is lower than the rate reported by Estafanous et al.<sup>11</sup> and Foster et al.<sup>4</sup> (41% and 51% respectively). The reason for this might lie partly in the fact that we performed phacoemulsification cataract extraction, a procedure that has been shown to induce less inflammation in the early postoperative period<sup>15</sup>, and partly in the type of uveitis.

Intraocular pressure seems to be only slightly affected by cataract extraction. We found an intraocular pressure increase in 6 eyes after cataract extraction. However, those were the patients whose intraocular pressure was elevated before the surgery as well. They were all managed with additional topical medications. Two patients with secondary glaucoma required trabeculectomy with mitomycin C. The rates of cystoid macular edema (11%), epiretinal membrane formation (3%) and posterior synechiae (14%) were lower than those reported by Foster et al.<sup>4</sup> whose rates were 46%, 23% and 15% respectively. This can be explained by the use of phacoemulsification technique in our series. However, the rate of posterior synechiae in our series was higher

than the rate reported by Estafanous et al.<sup>11</sup> (8%). Holland et al.<sup>16</sup> hypothesized that the continuous curvilinear capsulorhexis used in phacoemulsification leaves a smoother anterior capsule edge, unlike a can opener technique used in extracapsular cataract extraction, which in turn leads to a lower rate of posterior synechiae. Even though we also performed continuous curvilinear capsulorhexis as Estefanous et al., our higher rate of postoperative posterior synechiae can be partly explained by a larger percentage of patients with preoperative posterior synechiae (83% vs. 50%). However, our rate of cystoid macular edema (11%) was lower than the rate of Estefanous et al, and comparable with the rate reported by Harada et al.<sup>17</sup>. This finding can be explained by our lower rate of postoperative recurrence of inflammation that required treatment (23% vs. 41%).

Intraocular lens biocompatibility, i.e. the inflammatory response produced by an intraocular lens implant is still a controversial issue in uveitic eyes. The development in intraocular lens materials from polymethyl methacrylate (PMMA) through heparine surface modified PMMA, to modern foldable hydrophilic acrylic, hydrophobic acrylic and silicone has led to a diminished inflammatory response and better biocompatibility<sup>18–23</sup>. We implanted three different types of intraocular lenses in our study: a heparin surface modified PMMA, hydrophobic acrylic, and silicone intraocular lenses.

The evaluation of giant cell deposits on the lens surface showed no statistically significant difference between those three implanted materials in our study. Rauz et al.<sup>12</sup> evaluated the incidence of giant cell deposits and posterior capsule opacification on acrylic, silicone and hydrogel intraocular lenses. Giant cells were most often seen on acrylic biomaterial, but the difference was not statistically significant. There was no association between posterior capsule opacification and various lens biomaterials.

Alio et al.<sup>13</sup> compared hydrophobic acrylic, silicone, PMMA and heparin surface modified PMMA intraocular lenses in patients with uveitic cataract, and concluded that the acrylic and heparin surface modified PMMA lenses had the lowest incidence inflammation recurrences. The highest incidence of posterior capsule opacification was observed on silicone intraocular lenses. Formanek et al.<sup>14</sup> evaluated hydrophilic acrylic, hydrophobic acrylic and silicone intraocular lenses in uveitic cataract, and concluded that hydrophilic acrylic material had good uveal, but worse capsular biocompatibility, the opposite being with hydrophobic acrylic material. Silicone lenses performed a little better than hydrophobic acrylic intraocular lenses in terms of uveal and capsular biocompatibility. Although our study has limitations due to its retrospective nature, and a small number of patients, with different types of uveitis, we have shown that phacoemulsification and posterior chamber intraocular lens implantation is safe and comparable with previous reports. However, the optimal intraocular lens biomaterial is yet to be produced.

We reported successful visual outcomes in our series of patients, but good preoperative control of inflamma-

tion, correct surgical timing, and vigorous postoperative supervision are essential for the success of surgery.

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## POSTOPERATIVNI ISHODI NAKON IMPLANTACIJE INTRAOKULARNE LEĆE U OČIMA S KATARAKTOM I UVEITISOM

### SAŽETAK

Unatoč napretku u kirurškoj tehnici, kao i implantacijskim materijalima, operacija katarakte kod pacijenata sa uveitisom je još uvijek zahtjevan operacijski zahvat. Retrospektivno smo ocijenili postoperativne ishode operacije katarakte u 35 očiju kod 29 pacijenata s uveitisom. U svih pacijenata je načinjena fakoemulzifikacija sa implantacijom intraokularne leće u stražnju očnu sobicu. Postoperativni pregledi načinjeni su drugi postoperativni dan, te nakon 7 dana, 1, 3 i 6 mjeseci nakon operacije. U studiju je uključeno 16 muškaraca i 13 žena, čiji je raspon starosti iznosio od 31 do 68 godina. Pacijenti su praćeni najmanje 4, a najviše 35 mjeseci. Na posljednjoj kontroli 33 očiju (94%) je imalo poboljšanje vidne oštine u odnosu na preoperativnu vidnu oštrinu ( $p < 0.05$ ). Nakupine gigantskih stanica na optičkom dijelu intraokularne leće zabilježeno je u 7 očiju (20%). Opacifikacija stražnje kapsule dogodila se u 10 očiju (29%). Klinički vidljiv cistoidni makularni edem zabilježen je u 4 oka, a 2 oka su podvrgnuta trabekulektomiji sa mitomicinom C zbog sekundarnog glaukoma. Operacija katarakte kod pacijenata sa uveitisom dovodi do uspješnog oporavka vidne oštine, ukoliko je zahvat proveden u optimalnom trenutku i uz adekvatnu protuupalnu terapiju. Nije bilo statistički značajnih razlika u stupnju upale nakon implantacije različitih vrsta intraokularnih leća.