

Cataract Surgery in Patients With Fuchs' Heterochromic Iridocyclitis

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Purpose: To evaluate the results of cataract extraction and posterior chamber intraocular lens (IOL) implantation in patients with Fuchs' heterochromic iridocyclitis (FHI).

Methods: We studied the records of 35 patients with FHI who underwent cataract extraction. Extracapsular cataract extraction (ECCE) was performed by phacoemulsification through a scleral flap in 9 patients and by manual delivery of the nucleus through a corneal section in 26 patients.

Results: After a mean follow-up time of 24 (3–60) months, the visual acuity in 21 eyes (60%) was 20/20, and all eyes had 20/40 or better vision. Six eyes with implanted regular PMMA IOL developed a marked anterior uveitis, which was resolved within 3 weeks with topical steroids. Only 1+ or 2+ cellular reaction was observed postoperatively in patients with heparin-coated lens implantation and patients who underwent phacoemulsification. Biomicroscopic evidence of giant cell activity was observed in two patients with heparin-coated IOL and in 11 with regular PMMA IOLs after ECCE (two after phacoemulsification). Four eyes developed intraocular pressure elevation that reverts to normal within 24 weeks with medical therapy.

Conclusions: These results indicate that the surgical outcomes of FHI patients after cataract surgery appear to be better when the phacoemulsification technique is used or when heparin-coated lenses are implanted. *Jpn J Ophthalmol* 1999;43:308–311 © 1999 Japanese Ophthalmological Society

Key Words: Cataract surgery, Fuchs' heterochromic iridocyclitis, phacoemulsification, surface-modified intraocular lens.

Introduction

Cataracts develop frequently in patients with uveitis, either as a result of inflammation or because of steroid treatment for inflammation. The incidence of cataracts in Fuchs' heterochromic iridocyclitis (FHI) ranges from 25%–75%^{1–4} FHI is a unilateral chronic, nongranulomatous uveitis that affects men and women between the ages of 20 and 40 years. It was first described by Fuchs⁵ in 1906. The diagnosis can be made on the basis of small white, diffuse keratic precipitates, minimal cells and flare, lack of posterior synechia, and specific atrophic changes in the iris.

The cataract is typically of the posterior subcapsular type and generally develops after the age of 40 years.⁶

Previous articles have described the signs and complications of FHI.^{6–16} In this study, we evaluated the visual and surgical outcome of extracapsular cataract extraction (ECCE) in patients with FHI. The lens was delivered either by the classical nucleus expulsion method or by phacoemulsification, and surface-modified, posterior chamber (PC) intraocular lenses (IOL) or regular PMMA IOLs were implanted.

Materials and Methods

We studied the records of 35 patients (35 eyes) with FHI who underwent cataract extraction. The diagnosis of FHI had been made by using the criteria of Kimura et al,⁷ which consisted of: (1) small, diffusely distributed, white keratic precipitates; (2) an-

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terior chamber reaction; (3) iris atrophy with or without heterochromia; (4) a few cells in the vitreous cavity; and (5) absence of posterior synechia. Additionally, each patient was evaluated for other causes of uveitis, and none of the subjects had any other cause for uveitis. Patients with a history of ocular trauma were excluded.

The ages of the patients ranged from 14–66 years (mean 36.73 ± 9.31 years). Twenty-four patients (68.6%) were men and 11 (31.4%) were women. The right eye was operated on in 21 cases. Preoperatively, four patients had received topical treatment for glaucoma.

Before surgery, the degree of iris atrophy, the state of iris vasculature, and the intraocular pressure were recorded. The cellular activity in the anterior and posterior segments was determined by using the criteria of Kimura et al.⁸ ECCE was performed by phacoemulsification through a scleral flap in 9 patients and through a corneal section with manual delivery of the nucleus in 26 patients. Peripheral iridectomy was not performed in any of the patients. Capsulotomy was performed by the envelope technique in patients who underwent manual nucleus expulsion. All posterior chamber IOLs were placed in the capsular bag. Heparin-surface-modified IOLs (728 C; Pharmacia, Uppsala, Sweden) were used in eight eyes that underwent classical ECCE with manual nucleus expulsion (Table 1). Of the 35 patients, 1 refused insertion of an IOL. Patients were seen on the first and third postoperative day, then on the first and second week, and first month. Thereafter, the patients were seen regularly at 3-month intervals.

In the postoperative period, topical antibiotics (Tobrex) and topical nonsteroidal anti-inflammatory drugs (Ocufer) were administered five times daily. Topical corticosteroids (Pred Forte) were applied hourly for 3 days, then tapered gradually to one drop daily for 1 month.

Statistical analysis was done by the Kruskal–Wallis Test.

Results

Bleeding occurred in nine eyes (25.7%) soon after entrance into the anterior chamber through the cornea and the bleeding was controlled easily by hyaluronic acid (Healon). None of the nine patients who underwent phacoemulsification had a history of hyphema during surgery. Difficulty in pupillary dilatation was noted during the preoperative period in seven patients. However, stretching of the pupil had been sufficient for nucleus delivery in these patients. No intraoperative surgical complications occurred in any of the patients.

In the postoperative period, severe anterior uveitis developed in six eyes (17.1%), which was resolved within 3 weeks with intensive topical steroid treatment (Pred Forte). Five other patients developed mild anterior chamber reaction with 2–3+ cells that required no additional treatment except routine postoperative use of topical steroid drops. Only 1+ or 2+ cellular reaction was observed postoperatively in patients with heparin-coated lens implantation and patients who underwent phacoemulsification ($P = .063$).

There was an increase in postoperative intraocular pressure (IOP) in four eyes; IOP returned to normal within 2–4 weeks with medical therapy, but the results were not statistically significant in either of the groups ($P = .423$). Two of these patients were already on glaucoma therapy (Timolol maleate, 0.5%, 2×1) preoperatively.

Biomicroscopic evidence of giant cell activity was observed in 2 patients receiving heparin-coated IOLs and in 11 patients with regular PMMA IOLs after ECCE (2 after phacoemulsification) ($P = .097$). After a mean follow-up of 24 (3–60) months, the best-

Table 1. Summary of Operative and Postoperative Data of Patients

Type of ECCE	Type of IOL	Number of Patients	Vision		Hyphema	IOP Rise	Severe Uveitic Reaction	Giant cell Activity on IOL
			20/20	20/40–20/20				
Manual delivery of nucleus	None	1	–	1	1	–	–	–
	Regular PMMA IOL	17	9	8	5	3	6	11
	Heparin-coated IOL	8	5	3	3	1	–	2
Phacoemulsification	Regular PMMA IOL	9	7	2	–	–	–	2
Total		35	21	14	9	4	6	15

ECCE: extracapsular cataract extraction, IOL: intraocular lens, IOP: intraocular pressure, PMMA: polymethyl methacrylate.

corrected visual acuity testing revealed that 21 eyes (60%) achieved 20/20 and all eyes achieved 20/40 vision or better (Table 1).

Discussion

Fuchs' heterochromic iridocyclitis usually occurs in quiet eyes and is often discovered during a routine examination for glasses. The two most common signs at presentation are cataract and vitreous floaters.³ Generally, patients develop a cataract after inflammation has been present in the eye longer than 15 years. As a result, many of the patients are older than 40 years of age when cataract surgery is required.⁶

There is some controversy in the literature about the results of cataract surgery in patients with FHI. Ward and Hart⁹ reported that there was a high incidence of glaucoma, hyphema, and vitreous hemorrhage after intracapsular cataract extraction (ICCE) in patients with FHI. Norn¹⁰ published the results of 19 patients diagnosed with FHI who underwent cataract surgery. Of these patients, ICCE was performed in 6 patients and ECCE in 13 patients. The postoperative complications included: hyphema in three patients (16%), synechia, and capsular opacity in five patients (26%), secondary glaucoma in six patients (32%). Visual acuity was better than 20/40 in 12 patients (63%). In 1974, Smith and O'Connor¹¹ reviewed the complications of cataract surgery in 23 patients who underwent ICCE and 6 patients who underwent ECCE. They reported 20/40 or better visual acuity in 25 patients (86%). Vitreous loss occurred during surgery in one patient, which resulted in glaucoma and retinal detachment. Except for the three patients (10%) who developed secondary glaucoma, no other vision-threatening complication or severe postoperative inflammation was found in their study. In Liesegang's series,¹² cataracts and glaucoma were suggested as poor prognostic indicators in FHI associated with cataract surgery. In his series, the final visual acuity at the last follow-up was 20/40 or better in eight patients (47%). Mills and Rosen¹³ described the surgical results in eight patients with FHI who underwent ICCE with iris-supported IOL insertions. Seven patients (87.5%) achieved 20/30 or better vision. Four patients (50%) developed elevation of intraocular pressure. In 1983, Jain et al² reported that 16 eyes (76%) had visual acuity of 20/40 or better in a series of 21 patients with FHI. Of these, 17 patients underwent ECCE, 1 patient underwent unplanned ICCE, and 3 patients underwent unplanned ECCE. Gee and Tabbara¹⁴

studied the outcomes of cataract surgery in 15 patients with FHI. Ten of these also had capsular-fixated PC IOL. All these patients had a postoperative best-corrected visual acuity of 20/40 or better without any major intraoperative complications. In 1990, Jones¹⁵ reported a higher incidence of uveitis and glaucoma in patients with FHI who underwent ECCE and PC IOL implantation compared to the incidence in patients who underwent ECCE without IOL. The final conclusion of his study was that patients with severe iris atrophy, secondary glaucoma, or severe abnormalities of the iris vasculature were not good candidates for PC IOL implantation.

Conversely, Sherwood and Rosenthal¹⁶ reported that IOL implantation was a poor prognostic factor for patients with FHI who underwent cataract surgery. Apple et al¹⁷ reported on the advantages of capsular fixation to minimize uveal contact. McDonnell et al¹⁸ found that among patients with sulcus fixation, 13% had iritis, 24% had cyclitis, and 44% had granulomatous reaction around the IOL loops. Because the causes of fibrinous uveitis after cataract surgery appear to be related to the IOL in patients with FHI, iris contact, capsular-fixation PC IOL seems to be the ideal choice. In our patients, all the IOLs were placed in the capsular bag and severe uveitic reaction was seen in only 6 eyes. The uveitis was resolved within 3 weeks after topical corticosteroid therapy.

Inflammation after cataract surgery in uveitis patients results partially from the bioincompatibility of the IOL with the ocular tissues. The inflammatory response occurs as complement activation,^{19,20} or protein and cell leakage from dilated uveal vessels, which can then lead to precipitates on the IOL surface and synechia formation. Surface modification of a PMMA IOL by coating it with 2% hydroxypropyl methylcellulose solution²¹ or heparin^{22,23} is known to reduce postoperative inflammation.

Reduced cellular adhesion in the immediate postoperative period was reported in two series using surface modification in FHI and mixed uveitis patients.^{24,25} Ygge et al²³ suggested that surface modification with heparin makes the lens more hydrophilic, which diminishes the electrostatic forces. They found a marked reduction in postoperative cellular reaction with the heparin-coated PC IOLs compared to the regular PMMA IOLs after cataract surgery.²³ This was confirmed in our study. Miyake and Maekubo²⁶ also reported that heparin surface modification has favorable effects upon the blood-aqueous barrier function particularly during the early postoperative periods. This finding may explain the

absence of severe anterior chamber reactions with heparin-coated IOLs.

The outcomes in the nine patients who underwent phacoemulsification were likely to have a good prognosis. Two articles reported favorable surgical outcomes in Fuchs' cataract surgery using phacoemulsification.^{14,27} Phacoemulsification enhanced our ability to ensure capsular bag fixation of the implant, which reduced uveal contact by the IOL. Operating in a closed system during phacoemulsification also avoids the sudden decrease in IOP and reduces the risk of hemorrhage during ocular entry.

One of the other significant complications in FHI reported in the literature is elevated IOP. It was reported that elevated IOP after surgery was seen in 3%–35% of the eyes with FHI.⁶ The incidence of glaucoma in FHI is 15%–50%.² Therefore, IOP elevation after surgery in FHI patients can be considered as the natural course of the disease. Two of the four patients who developed elevated IOP after surgery in our series were the patients who had received topical treatment for glaucoma in the preoperative period.

Surgical outcomes of FHI patients after cataract surgery appear to be better with the use of phacoemulsification and heparin-coated IOLs. All our patients achieved 20/40 vision or better without any major surgical, intraoperative or postoperative, complications. Intraocular lens implantation in this series did not appear to affect the prognosis unfavorably.

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