

Long-Term Outcome of Cataract Extraction and Intraocular Lens Implantation in Fuchs' Heterochromic Iridocyclitis

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Abstract

Purpose: To investigate long-term visual outcome and complications after cataract extraction and intraocular lens (IOL) implantation in Fuchs' heterochromic iridocyclitis (FHI)

Methods: In this retrospective study in a private eye clinic in Tehran, 25 eyes of 24 patients with FHI who underwent cataract extraction and IOL implantation were evaluated based on their visual outcome and intraoperative and postoperative complications.

Results: Cataract extraction was performed on 12 men and 13 women between 19 to 62 years old (mean 39.4±10.3 years) with 102.20±45.54 months (range, 61-200 months) follow-up. Mean visual acuity (VA) improved from 1.26±0.57 logMAR (less than ²⁰/₂₀₀) before surgery to 0.08±0.22 logMAR (more than ²⁰/₂₅) at the last follow-up (P<0.001). Fifteen eyes (60%) achieved VA≥²⁰/₂₀. Mean intraocular pressure (IOP) in the last follow-up was slightly lower than preoperation but was not statistically significant (P=0.42). Glaucoma was found in 2 (8%) cases before surgery and 3 more cases (12%) were diagnosed along the postoperative follow-up. Severe postoperative inflammation with hypopyon and fibrin formation occurred in 2 (8%) cases and severe recurrent intraocular inflammatory episodes appeared in 4 (16%) cases during the follow-up. YAG laser capsulotomy was done in 7 (28%) cases were developed posterior capsular opacity.

Conclusion: Long-term visual outcome after cataract extraction and IOL implantation in patients with FHI are satisfactory. However, possible inflammatory crisis and glaucoma necessitate intensive care and regular postoperative long-term follow-up of these patients.

Keywords: Fuchs' Heterochromic Iridocyclitis, Cataract, Intraocular Lenses, Long-Term Follow-Up

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Introduction

Fuchs' heterochromic iridocyclitis (FHI) was first described by Lawrence in 1843 as a chronic nongranulomatous uveitis,¹ that initially diagnosed in patients who were between 20 to 40 years old. Its clinical and pathological aspects were fully described by Fuchs in 1906.² This disease comprises about 3.5-8% of endogenous uveitis.^{3,4} It is unilateral in 90% of cases and is distributed equally in both sexes.⁵ The disease is usually presented with visual symptoms and diagnosed by white stellate keratic precipitates (KPs), atrophic changes in iris, few cells in anterior chamber and vitreous and absence of posterior synechiae.⁶ The etiology is unknown but some theories like toxoplasma infection, immune dysfunction, lymphocyte infiltration, herpes simplex virus or measles infection have been suggested.^{7,8}

Cataract is a common complication of Fuchs' syndrome. Lens opacity in most patients has a posterior subcapsular form which is characteristic of a complicated cataract. The cataract usually appears in patients older than 40 years⁹ and has been reported to involve 15% to 75% of patients.¹⁰⁻¹³ Cataract surgery in these patients has been performed using different techniques like aspiration, phacoemulsification, and extracapsular cataract extraction (ECCE). Although in recent studies with 12 to 18 months of follow-up, it has been reported that cataract surgery improved visual outcome and reduced the rate of complications,¹⁴⁻¹⁶ but in the long-term, glaucoma, uveitis recurrences, and posterior capsular opacification might worsen patients' vision.

The present study was conducted to study the long-term visual outcomes as well as complications after cataract surgery and intraocular lens (IOL) implantation in patients with FHI consulting our private clinic having at least five years of follow-up period. To our knowledge this study has the longest follow-up period after cataract extraction and IOL implantation in patients with FHI.

Methods

This is a retrospective study included 25 eyes from 24 patients with diagnosis of FHI who had undergone cataract surgery and IOL implantation that had been followed for at

least five years in a private eye clinic between 1995-2011. FHI was diagnosed using Kimura diagnostics criteria to be white fine stellate-shaped KPs spread on corneal endothelial surface, iris atrophy with or without heterochromia or iris nodules, minimal cell and flare in anterior chamber and vitreous and the absence of iris synechiae.¹⁷ All patients with less than five years postoperative follow-up, history of eye trauma, all other forms of uveitis and retinal vasculitis were excluded.

Patients were operated based on their age and the condition of the lens using lens aspiration, ECCE, and phacoemulsification methods. The IOLs types were poly methyl methacrylate (PMMA) and acrylic lenses. All operations were carried out by the same surgeon.

Postoperatively, all patients used topical steroid and antibiotics four times daily for one week, then tapered but steroid was used for at least 4 weeks. In 3 patients with severe postoperative uveitis frequent topical steroid (every one hour) and cycloplegic (atropine) 4 times daily was used. Trans-septal triamcinolone acetonide was injected in cases with pre and postoperative episodes of intraocular inflammation associated with severe vitreous opacity. After operation all patients were examined one day, three days and two weeks after cataract surgery. Further examinations were performed for patients if required for up to two months. Routine long-term examinations for all patients were performed every six months to one year for at least 5 consecutive years.

Preoperative data included age, sex, affected eye, best corrected visual acuity (BCVA), intraocular pressure (IOP), the inflammatory findings in anterior chamber, type and degree of lens opacification, anterior vitreous opacity and fundoscopic examination findings using noncontact lens. The intraoperative information consisted of the surgical techniques, IOL characteristics and intraoperative complications. The postoperative measurements included BCVA, IOP, inflammatory conditions, vitreous opacity, and fundus examination findings. A written consent was obtained from all patients. All patients' personal data in our study remained confidential. We gave each patient's files a unique number and from this point on only this

number was used for all subsequent data analysis.

All data were analyzed using SPSS (Version 17.0, SPSS Co, Chicago, IL). To compare visual acuity (VA) and IOP before and after surgery paired t-Test was performed. P value less than 0.05 were considered to be statistically significant.

Results

Twenty-five eyes of 24 patients were studied, 13 (52%) were females and 12 (48%) patients were males. The mean age was 39.4 ± 10.3 years (range, 19-62 years). The involvement of right and left eyes were 11 (44%) and 14 (56%), respectively. In one patient both eyes were involved and underwent surgery. The mean patients' follow-up period was 102.20 ± 45.54 months (Range, 61-200 months).

Lens opacity was posterior subcapsular in 12 (48%) eyes and mature cataract in 6 (24%) eyes. Cataract surgery was performed with 3 different techniques: phacoemulsification in 13 (52%), aspiration in 7 (28%) and ECCE in 5 (20%) cases. In the last techniques, one patient underwent combined procedure (ECCE IOL + Trabeculectomy). We used PMMA in 16 (64%) patients and acrylic lenses in 9 (36%) patients. IOL was inserted in the bag (capsulorhexis) in 14 (56%) eyes and sulcus (can-opener capsulotomy) in 11 (44%) eyes.

The BCVA before and after surgery is shown in table 1. BCVA showed significant improvement after surgery ($P < 0/001$). All eyes had a BCVA less than $20/40$ before surgery. Postoperatively, in 23 (92%) eyes BCVA improved to $20/40$ or better. Furthermore, 15 (60%) eyes reached BCVA of $20/20$ or better. Two patients had BCVA less than $20/40$ due to the vitreous opacity. There was no significant difference between postoperative VA of patients based on surgical techniques or IOL types ($P = 0.46$, $P = 0.70$ respectively).

The mean IOP decreased in last follow-up compared with the mean preoperative IOP but the reduction was not statistically significant ($P = 0.42$) (Table 2). Glaucoma was seen in 5 (20%) patients before and during the post-op follow-up period. The IOP of two patients was more than 30 mmHg, before the surgery. Of these 2 patients, one patient with IOP of 50 mmHg and cup/disc 0.6, underwent

ECCE combined with trabeculectomy. The IOP was reduced to 9 mmHg during 4.5 years of follow-up. In the other patient, preoperative IOP was 40 mmHg without cupping and was stabilized to 16 mmHg by a dual therapy for 7 months preoperatively. After operation the IOP raised and was not controlled even after trabeculectomy. Finally the IOP was stabilized to 20 mmHg with a shunt (Ahmed valve) procedure. This patient had a $20/200$ vision at the last follow-up with vitreous opacity and cupping of 0.9.

Table 1. Comparison of visual acuity before and after cataract surgery for patients with Fuchs' syndrome based on logMAR

BCVA	Mean	SD	Range	P*
Preoperative	1.26	0.57	0.4-2.09	<0.001
Postoperative	0.08	0.22	-0.1-1	

BCVA: Best corrected visual acuity
SD: Standard deviation
*: Based on T-test
*: Statistical significance $P < 0.05$

Table 2. Comparison of intraocular pressure before and after cataract surgery for patients with Fuchs' syndrome based on mmHg

IOP	Mean	SD	Range	P*
Preoperative	16.12	7.48	9-50	0.42
Postoperative	14.60	4.76	9-33	

IOP: Intraocular pressure
SD: Standard deviation
*: Based on T-test
*: Statistical significance $P < 0.05$

Postoperative glaucoma was developed in 3 other patients. One of these patients had a bilateral FHI. The IOP raised to 60 mmHg in one eye after five years of secondary IOL implantation in the sulcus. IOP was controlled after two repeated trabeculectomy with mitomycin C. In the second patient, five years following capsulotomy the IOP raised to 60 mmHg and could not be controlled by medications. The patient underwent trabeculectomy with mitomycin C and finally IOP was controlled at the last visit. In the third patient, IOP reached 60 mmHg seven years postoperatively. After the shunt (Ahmed valve) procedure, IOP was reduced to 15 mmHg with

monodrug therapy. This patient had 2 plus KPs with iris nodule before and after surgery but no anti-inflammatory treatment was needed. Three of the 5 above mentioned patients had multiple episodes of severe uveitis prior to the IOP elevation and 2 were treated with trans-septal triamcinolone acetonide.

Intraoperative complications in our patients were limited to three instances of minimal blood oozing from iris which was self limited and did not affect the procedure.

Postoperative uveitis as mild, moderate and severe occurred in 9, 3 and 2 patients, respectively. The latter 2 patients developed severe uveitis in day 10 and day 40 after surgery which was accompanied with severe vision loss, fibrin membrane formation, raised IOP and hypopyon. At last, uveitis was controlled by application of frequent topical steroid therapy. Recurrent intraocular inflammation and vitreous opacification was observed in 4 (16%) patients which were controlled by trans septal long acting corticosteroid injection. There were no anterior chamber flare and iris synechiae. Inflammatory precipitates were observed on the IOL surface in 11 (44%) of patients after cataract surgery which persisted as a mild form in only 3 patients at the last follow-up.

In the last follow-up, 12 (48%) eyes had posterior capsule opacification (PCO), which necessitated neodymium: YAG (Nd:YAG) laser capsulotomy in 7 cases (28%). YAG laser was performed in patients that complained from visual disturbance due to PCO. There was no significant difference in performing YAG laser capsulotomy based on IOL type ($P=0.508$). The mean time between cataract surgery and capsulotomy was 55.33 ± 34.81 months (range, 10-100 months).

Discussion

We found an acceptable visual outcome in our patients after cataract surgery. Ninety-two percent of our patients achieved at least $20/40$ of visual acuity, which is in concordance with other studies.^{14-16,19} The result of four similar studies and the present study is shown in table 3. Our findings indicate good visual outcomes with slight differences. As indicated in some reports, the most common cause of decreased vision to less than $20/20$ has been vitreous opacification (24%).^{14,20} Scott et al reported a VA equal or better than $20/25$ in all their patients undergone pars plana vitrectomy and cataract surgery.²¹ In a similar study by Soheilian et al 78% of the patients obtained BCVA equal or better than $20/40$.²² Tejwani et al have reported 13 out of 103 patients having vision less than $20/40$ five weeks after surgery. The causes were anterior chamber inflammation in 4 patients, glaucoma in 2 patients, vitreous opacification in 2 patients and macular hole, PCO, corneal edema and astigmatism in the rest of cases. However, the authors did not indicate the causes of long-term decrease of VA.¹⁶

In this study glaucoma was noticed in 5 (12%) patients which has been reported to be 3-35% in other studies.¹⁶ The IOP raised in our patients from 5 to 7 years after cataract surgery which suggests the need for a long-term follow-up of these patients. Similar to our findings, Ram et al have succeeded to control the rise of IOP in their patients by medical means,¹⁹ and Javadi et al have reported to have only transient raised IOP in 2 cases.¹⁴ Milazzo et al reported postoperative development of open angle glaucoma in 3 out of 93 patients with Fuchs' Syndrome. One patient had visual loss caused by resistance to medical and surgical treatments.¹⁸

Table 3. Visual outcomes after cataract surgery in patients with Fuchs' heterochromic iridocyclitis, in four other studies and the present study

	Authors				
	Tejwani et al ¹⁶	Javadi et al ¹⁴	Budak et al ²⁵	Milazzo et al ¹⁸	Present study
Number of cases	103	41	35	94	25
VA $\geq 20/40$ (percent of cases)	92.5	100	100	76	92
Mean F/U (months)	13	18	24	41	110

VA: Visual Acuity
F/U: Follow-up

Hey et al have reported 30 glaucomas out of 111 patients, with 73% of those being resistant to drug therapy.²⁰ Also in our study, one patient with BCVA less than $20/40$, had advanced glaucoma. These findings are in a concordance with other reports, indicating glaucoma may be considered as one of the main causes of visual loss after cataract surgery in Fuchs' syndrome.²³

Early postoperative severe uveitis with hypopyon was observed in 2 (8%) cases in our study which was successfully treated using steroid therapy. Javadi et al reported 10% of their patients having fibrin formation without hypopyon.¹⁴ Ram et al reported severe inflammation in 13.8% of their patients undergoing extracapsular cataract surgery¹⁹ and 5% in patients undergoing phacoemulsification.¹⁵ In contrast, Tejwani et al and Milazzo et al have reported no case of severe uveitis in their investigations.^{16,18}

In our study, 4 (16%) patients had recurrent and severe intraocular inflammation and vitreous opacification which was accompanied with glaucoma in 3 cases. Ram et al reported this finding in 3.4% of patients undergoing ECCE surgery¹⁹ and in none of the patients undergoing phacoemulsification.¹⁵ Tejwani et al have reported 4.8% and¹⁶ Milazzo et al have reported 7 cases out of 93 patients to have increased vitreous opacity after cataract surgery.¹⁸ The recurrence of uveitis in patients undergoing cataract surgery due to other causes of uveitis has been much higher (41%) than FHI.²⁴

In our patients, surface precipitates on IOL was observed in 11 (44%) cases which was observed only in 3 patients at the last follow-up, which is similar to other studies.^{1,8,11} We did not encounter any posterior synechiae but Millazzo et al have reported this complication in 10% of their patients.¹⁸

Tejwani et al have excluded these patients from their study.¹⁶

Among the patients with posterior capsular opacity in our study, 7 (25%) patients needed capsulotomy. Capsular opacity has been reported to be 14.6%, 2.7%, 22% and 30% in other studies.^{14,15,18,19} Tejwani et al have reported just 1 case with posterior capsular opacification (less than 1%).¹⁶ Since the mean duration between cataract surgery and capsulotomy was nearly five years, its relatively high incidence in our study could be due to the longer follow-up period. The other reasons might be related to intraocular inflammation or younger age of the patients. However, we found no significant difference in incidence of YAG laser capsulotomy based on IOL types ($P=0.508$).

The mean age of our patients at the time of cataract surgery and the form of lens opacity are compatible with other studies.^{14-16,18}

The power of the present study is the length of follow-up but there are some limitations namely the disparity with methods of cataract surgery and the type of IOL utilized which has been unavoidable, due to change in paradigm of cataract surgery and the advances in surgical techniques.

Conclusion

In conclusion our study demonstrates a good long-term anatomical and visual outcome after cataract surgery and IOL implantation in patients with FHI. However, some complications such as postsurgical severe uveitis, multiple recurrences of intraocular inflammation and refractory glaucoma are observed in our long follow-up period. The occurrence of these complications indicates the need for a constant and long-term follow-up of these patients after cataract surgery.

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