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Late intraocular lens exchange in dissatisfied patients with multifocal intraocular lens implantation

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Abstract:

Intraocular lens (IOL) exchange may be required after multifocal IOL implantation due to dissatisfaction. Late IOL exchange is more challenging when it is done with capsulotomy. We presented a retrospective case series study enrolling four consecutive eyes reviewing late IOL exchange due to decreased vision and dysphotopsia. High residual hyperopia, astigmatism, and IOL tilt occurred in 3 eyes, respectively. The mean time to the IOL exchange was 15.8 ± 10.63 months. After separation of the adhesions by visco-dissection assisted with a 27-gauge needle and sinsky hook, IOL was explanted. One-piece IOL was implanted in the bag in two eyes without posterior capsulotomy, whereas three-piece IOL was implanted in the sulcus after viscoelastic tamponade in the other 2 eyes with capsulotomy. No complication occurred and dysphotopsia disappeared. The mean logarithm of the minimum angle of resolution best-corrected visual acuity significantly improved from 0.33 ± 0.12 preoperatively to 0.11 ± 0.13 postoperatively. In conclusion, late IOL exchange could be safely performed with proper technique and achieve good results.

Keywords:

Capsulotomy, intraocular lens exchange, multifocal intraocular lenses, optic capture

Introduction

Multifocal intraocular lens (IOL) implantation has become more popular for the correction of presbyopia with cataract recently. However, dissatisfaction owing to decreased visual acuity and dysphotopsia may occur and some still need multifocal IOL explantation eventually.^[1,2] Nonetheless, late IOL exchange was challenging and more complicated, especially in cases with posterior capsulotomy.^[2] In this case series study, four consecutive eyes in three patients who received multifocal IOL implantation and subsequent late IOL exchange by a single surgeon (Dr. Hou) were enrolled. The details of the procedures and results of late IOL exchange were presented.

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Case Reports

Case 1

A 59-year-old female underwent uneventful cataract surgery with multifocal IOL implantation in both eyes elsewhere. She complained of severe glare, halos, and blurry vision in both eyes and visited our clinic 6 months postoperatively. The best-corrected visual acuity (BCVA) was 0.6 with refraction of $+1.75 -0.75 \times 22^\circ$ in the right eye and 0.5 with refraction of $+0.75 -1.25 \times 177^\circ$ in the left eye. Biomicroscopy showed clear cornea and mild decentration of multifocal acrylic IOLs with an intact posterior capsule in both eyes. The posterior segment was unremarkable. Eight months after cataract surgery, IOL exchange was performed in the left eye. IOL calculation of the secondary IOL was performed using the SRK/T-formula. After reopening the side port and the original temporal corneal

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incision wound by microvitrectomy blade 20G, a viscoelastic agent was injected into the anterior chamber, and the temporal wound was extended to 2.8 mm. Because of the strong adhesion between fibrotosed lens capsule and IOL, the edge of anterior capsulotomy at a haptic site was carefully lifted using a 27-gauge needle, then a small tunnel was created by spatula and Sinskey hook. The viscoelastic agent was slowly injected into the tunnel to separate the adhesions between the IOL and adjacent capsule by visco-dissection. Multifocal IOL was mobilized in the capsular bag by a Sinskey hook. Then, the IOL was placed in the anterior chamber and cut into two pieces by Vannas scissors after adding more viscoelastic agent to protect corneal endothelium. Each piece was explanted, respectively, and a monofocal toric acrylic IOL was implanted into the bag and aligned with the axis of the marker. Postoperative vision improved to 1.0 with refraction of -2.25 . These dysphotopsia symptoms also disappeared. One month later, IOL exchange was uneventfully done with a monofocal acrylic IOL implantation in the bag after the removal of whole IOL with an intact posterior capsule in the right eye. Postoperatively, the BCVA of the right eye improved to 0.9 with refraction of $-2.25 -0.50 \times 23^\circ$.

Case 2

A 64-year-old female with bilateral nonproliferative diabetic retinopathy received eight times of intravitreal injection with anti-vascular endothelial growth factor agent in the right eye because of diabetic macular edema at a medical center. Because cataract formation progressed in the right eye, phacoemulsification surgery with multifocal acrylic IOL implantation was done in the right eye. Sixteen months after the cataract surgery, she visited our clinic because of blurry vision in the right eye. The BCVA of the right eye was 0.5 with refraction of $+0.25 -1.25 \times 85^\circ$. Ocular examination disclosed multifocal IOL decentration with one haptic in the bag and another haptic in the sulcus [Figure 1a]. The typical presentation of iris chafing with numerous pigmented deposits located on the IOL and a posterior capsulotomy was found [Figure 1b]. The haptic adhesion was too strong to be separated. To avoid potential enlargement of the posterior capsulotomy during visco-dissection, the part of the haptic inside the bag was left. In addition, viscoelastic tamponade was performed from the temporal wound and the top of the anterior chamber down to the capsulotomy to avoid vitreous prolapse. A three-piece IOL was implanted in the sulcus without anterior vitrectomy. The postoperative BCVA improved to 0.8 with refraction of $+0.25 -2.00 \times 86^\circ$.

Case 3

A 63-year-old female received cataract surgery with multifocal acrylic IOL implantation in the right eye at a local clinic. One year after the cataract surgery, she

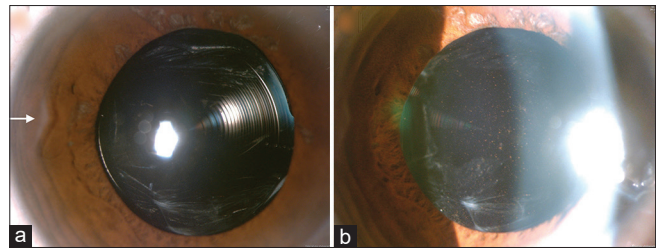


Figure 1: Slit lamp photograph of the right eye in case 2. (a) Temporal iris (white arrow) moved anteriorly because of a decentered and tilted multifocal intraocular lens with one haptic in the temporal sulcus and another haptic in the bag. (b) Numerous pigments dispersed on the intraocular lens with a large posterior capsulotomy

visited our clinic due to the persisted dysphotopsia and blurry vision. The BCVA of the right eye was 0.3 with refraction of $+0.75 -0.75 \times 65^\circ$. Biomicroscopy revealed a good IOL centration with significant capsular phimosis in the right eye and bilateral superficial punctate keratitis (SPK) due to dry eye [Figure 2a]. The fundus examination showed no remarkable findings. Although artificial tears were given and SPK disappeared thereafter, visual symptoms persisted. We enlarged the capsulorhexis with microscissors first, but the vision did not improve [Figure 2b]. Then yttrium–aluminum garnet (YAG) capsulotomy was conducted because posterior capsular opacification (PCO) formation was detected during follow-up. However, the vision only improved to 0.4, while glare persisted. Two and half years after the initial cataract surgery, the optic was removed and three-piece monofocal acrylic IOL was implanted with optic capture [Figure 2c]. Postoperatively, the BCVA improved to 0.8 with refraction of $+1.00 -0.50 \times 60^\circ$.

No complications of IOL exchange occurred in these four eyes. The mean logarithm of the minimum angle of resolution BCVA improved from 0.33 ± 0.12 preoperatively to 0.11 ± 0.13 postoperatively ($P = 0.003$). Their dysphotopsia symptoms all disappeared and they satisfied with the results of IOL exchange.

Discussion

Multifocal IOL has been widely used with cataract surgery to correct refractive errors and presbyopia. Despite general patient satisfaction is high after multifocal IOL implantation, the rate of multifocal IOL exchange also increased recently due to blurred vision, glare, halos, dysphotopsia, and dissatisfaction with waxy vision.^[1-3] The causes of blurred vision included ametropia, IOL decentration or tilt, dry eye syndrome, and PCO.^[1] Blurred vision attributed to both PCO and dry eye syndrome can also cause photic phenomena. The dry eye could occur in the early postoperative period and most SPK usually resolved with proper dry eye treatment within 3 months. Although spectacle and excimer laser corneal refractive surgery can

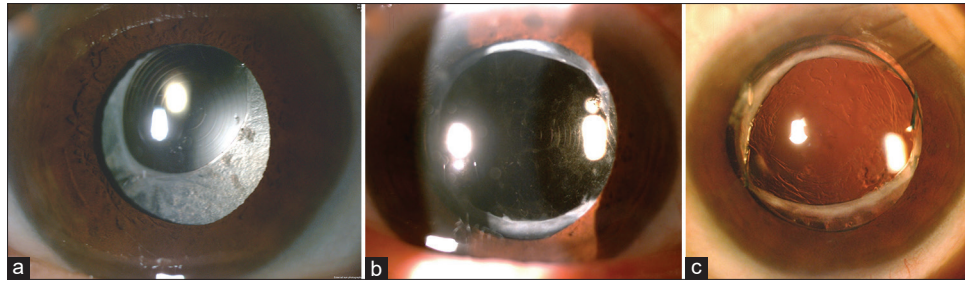


Figure 2: Slit lamp photograph of the right eye in case 3. (a) A significant anterior capsular fibrosis and phimosis occurred. (b) A round capsulorhexis was enlarged by microscissors. (c) A three-piece monofocal intraocular lens was well implanted in the sulcus with optic capture after explantation of multifocal intraocular lens

correct the residual refractive error, some patients may still have dissatisfaction due to the unique design properties of multifocal IOLs. Nevertheless, IOL repositioning or exchange with the ratio of 4%–7% may be necessary in some cases.^[1,3] Kamiya *et al.* reported the most common reasons for IOL exchange were waxy vision (58%), decreased contrast sensitivity (36%), dysphotopsia (34%), incorrect IOL power (20%), and IOL dislocation/decentration (4%).^[4] In our four eyes of three cases, there were high residual hyperopia or astigmatism in case 1, IOL tilt in case 2, and capsular phimosis and PCO in case 3. These findings of ametropia and IOL decentration/tilt may explain their phenomena of decreased vision and dysphotopsia.

Most reports of the time interval between the multifocal IOL exchange and the initial IOL implantation was a range from 3 days to 216 months.^[2,4,5] In our case series, the meantime to the multifocal IOL exchange was 15.8 ± 10.63 months (range from 8 to 30 months), which was relatively longer because their doctors were not willing to explant the multifocal IOL. In most reports, patient satisfaction was significantly improved after multifocal IOL explantation, but vision improvement was variable.^[2,4,5] Vision improved and dysphotopsia disappeared after IOL exchange in all presented cases.

IOL exchange may cause hazardous intraoperative complications, including zonular dehiscence, posterior capsular rupture, and hyphema. The most common complication was zonular dehiscence following with posterior capsular rupture.^[6,7] In addition, postoperative complications included corneal edema/decompensation, cystoid macular edema, elevated intraocular pressure, and retinal detachment were reported.^[8] Late IOL exchange may be more technically challenging than early exchange because of the fibrotosed capsule and the firmly adhered haptics. Removal of the IOL could run the risk of zonular stress or even dehiscence when trying to separate the haptics from the capsular fibrosis. We can lower the risk of zonular dehiscence and posterior capsule rupture by delicate creation of a small tunnel between the capsular fibrosis and haptics following with visco-dissection, and carefully mobilizing IOL assisted

with a sinsky hook. The IOL exchange in cases with capsulotomy would be riskier, and most of the cases needed anterior vitrectomy to remove prolapsed vitreous and implantation of iris-sutured, sulcus-fixated, or anterior chamber IOLs.^[2,9] Here, we can reduce the risk of vitreous prolapse by viscoelastic tamponade technique without anterior vitrectomy and combination with IOL implantation in the sulcus with optic capture.

Patients' complaints related to inherent properties of multifocal IOL usually emerge in the early postoperative days before PCO formation. Patients with PCO may still have the same complaints and dysphotopsia symptoms after neodymium-doped: YAG capsulotomy. We suggest reserving capsulotomy until all possible causes of patients' complaints have been ruled out or solved within the first 3 months, discussing the increased risk of potential IOL exchange before doing capsulotomy, and not to implant multifocal IOL in the fellow eye before solving problems of multifocal IOL in the first eye. Early IOL exchange surgery could be taken into consideration in patients with blurred vision and persisted dysphotopsia symptoms which could not be improved by conservative treatment within 6 months.

Conclusively, it is crucial to appropriately select the patients and do an uneventful surgery before implantation of multifocal IOLs. Moreover, when needed, late IOL exchange can be safely performed with proper technique and achieve good results in dissatisfied patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

The authors declare that there are no conflicts of interests of this paper.

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