IOL Exchange for Patients Unhappy With Multifocal IOLs

These patients may benefit considerably from use of the bag-in-the-lens technique.

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Multifocal IOLs have recently become a popular alternative to monofocal IOLs in patients seeking spectacle independence after cataract surgery or refractive lens exchange. Many authors have reported that near UCVA after multifocal IOL implantation is superior to that after monofocal IOL implantation.1-4 However, multifocal IOLs are known to cause adverse effects, such as reduced contrast sensitivity, increased visual aberrations, halos, and poor intermediate vision.1 Many of these complaints can be related to improper IOL centration (Figure 1), which, in the case of complex optics such as those of multifocal IOLs, is of the utmost importance.5,6 Although most complaints can be managed conservatively with spectacles, contact lenses, eye drops, or laser treatment, 7% of these patients will ultimately require an IOL exchange.1 This is mostly due to adverse effects inherent in the multifocal IOL design (glare and aberrations), miscalculation of lens power, or postoperative decentration or tilt of the multifocal IOL.2

With the increasing popularity of multifocal IOLs, the number of multifocal IOL exchanges has also risen considerably.3 It is therefore essential that comprehensive exclusion criteria be formulated and that proper preoperative assessment be performed, allowing surgeons to determine the surgical technique most appropriate for each patient. Special attention must be given to higher-order aberrations, which depend strongly on pupil size and IOL type and may change drastically in case of IOL decentration or tilt.3

This article presents a clinical report of our preferred IOL exchange indications and procedure, and the postoperative results to be expected after multifocal IOL exchange.

STUDY

All patients included in this study had complained of severely impaired vision after multifocal IOL implantation during an otherwise uneventful cataract surgery procedure between September 2005 and April 2011. These complaints included diplopia, uncomfortable
binocular vision, blurred vision, glare, halos causing inability to drive at night, loss of contrast sensitivity expressed subjectively by the need for more light during reading and blurred far vision, and photophobia to such degree that IOL exchange was deemed the only solution. All patients were informed that the success rate of replacing their multifocal IOL using the bag-in-the-lens technique was not 100% but estimated at higher than 50%.

Preoperative examinations included distance and near BCVA (both in decimal notation). Based on patient complaints, a glare test (C-Quant straylight meter; Oculus Optikgeräte GmbH) and aberrometry (iTrace Visual Function Analyzer; Tracey Technologies), with the result expressed in root-mean-square, were performed. Fundus examination and, if necessary, spectral-domain optical coherence tomography were performed. Power calculation for the secondary IOL was performed using the SRK/T-formula based on IOLMaster optical biometry (V.2.02, Carl Zeiss Meditec) or, if biometry with the IOLMaster was unsuccessful, with ultrasound biometry (Pacscan 300A Digital Biometric Ruler; Sonomed).

IOL exchange was performed by the same surgeon (Dr. Tassignon) for all eyes. The aim of these cases was to exchange the multifocal IOL for a Bag-in-the-Lens IOL (BIL; Morcher 89A; Morcher GmbH), which aids in preventing posterior capsular opacification in the long term. Depending on their preferences, patients were operated under topical anesthesia with benoxinate HCl 0.4% eye drops and intracameral injection of lidocaine HCl 0.2% or under general anesthesia. A 2.8-mm temporal sclerocorneal incision was made, followed by the injection of a 1/1,000 diluted solution of adrenaline in balanced saline solution. Next, the anterior chamber was filled with a long-molecular-chain ophthalmic viscosurgical device (Healon GV; Abbott Medical Optics Inc.).

After viscodissection and peeling of fibrotic tissue on the capsule, the multifocal IOL was mobilized in the capsular bag and removed from the eye in one or more pieces. Vitreous prolapse occurred commonly in eyes that had undergone Nd:YAG laser capsulotomy after the primary surgery, in which case anterior vitrectomy with a 23-gauge vitrec-
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24 Cataract & Refractive Surgery Today Europe September 2012

Tommy probe (Alcon Laboratories, Inc.) was performed. Last, a monofocal IOL was implanted and, depending on the wound stability, the wound was closed with corneal hydration or suturing. Figure 2 shows the anterior segment of a patient after BIL lens implantation. Similar results were seen in the other 21 eyes in which a BIL IOL was successfully implanted after exchange of the primary multifocal IOL.

Results

This study included 30 eyes of 21 patients. Average age at the time of the second surgery was 64 ±9 years (range, 44–76).

The most common subjective complaints (Table 1) were blurred vision and halos. Ophthalmologic comorbidities included retinal detachment and glaucoma in one eye, anterior ischemic neuropathy in one eye, and previous LASIK in two eyes. General comorbidities were found in four patients (20%), of whom three had cardiovascular disease and one had epilepsy.

Table 1. Subjective Complaints of Multifocal IOL Patients (N=30)

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blurred vision</td>
<td>11 (36%)</td>
</tr>
<tr>
<td>Glare/halos</td>
<td>8 (28%)</td>
</tr>
<tr>
<td>Photophobia</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Inability to drive at night</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Aniseikonia/diplopia</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>Multiple complaints</td>
<td>6 (20%)</td>
</tr>
</tbody>
</table>

The multifocal IOLs used for primary implantation were of a diffractive type in 25 eyes (83%), a refractive type in four eyes (13%), and a progressive optic type in one eye (4%). The multifocal IOL was implanted inside the capsular bag in all eyes, and Nd:YAG laser capsulotomy was performed in 11 (36%).

Multifocal IOL exchange was performed after an average period of 31 ±53 (range, 2–216) months. Depending on the structural integrity of the capsular bag, the BIL IOL was the preferred monofocal IOL implanted (21 eyes). In eyes in which the capsular integrity was compromised, an in-the-bag IOL (two eyes), a monofocal sulcus-fixated IOL (five eyes), or a monofocal iris-fixated IOL (two eyes) was implanted.

In two eyes, a supplementary multifocal IOL (Sulcoflex; Rayner Intraocular Lenses Ltd.) was placed in the sulcus in piggyback fashion with a monofocal BIL.

The main perioperative complication was vitreous prolapse necessitating anterior vitrectomy in seven eyes (23%), all of which had undergone Nd:YAG laser capsulotomy prior to multifocal IOL exchange. In one eye in which the multifocal IOL was exchanged for an Artisan IOL (Ophtec BV), a perioperative choroidal hemorrhage occurred, although with good final outcome. No other peri- or postoperative complications were observed.

None of the patients had cystoid macular edema. One of the Sulcoflex piggyback IOLs required removal after 6 months because of unsatisfactory quality of vision.

Distance BCVA improved significantly after multifocal IOL exchange, from 0.77 ±0.24 preoperatively to 0.96 ±0.11 postoperatively (30 eyes; paired t-test; P < .001), and near BCVA improved from 0.36 ±0.10 (0.3/0.8) to 0.53 ±0.16 (0.3/0.5; 20 eyes; P < .001). The difference between targeted and achieved refraction (spherical equivalent) was -0.17 D ±0.57 D (range, -0.50 to 1.25 D). Subjective complaints, as listed in Table 1, were resolved after multifocal IOL exchange, except in one eye with the Sulcoflex that later required explantation.

Take-Home Message

- IOL exchange can be proposed for patients who are unhappy with multifocal IOLs and can result in an improvement in visual acuity.
- Preoperative assessment of patients’ subjective complaints should include refractive errors such as hyperopic shift and ametropia, decentration or tilt, increased glare, and aberrometry.
- Bag-in-the-Lens IOL implantation aids in preventing posterior capsular opacification in the long term.
SUMMARY

These results show that patients implanted with multifocal IOLs who experience a severe decrease in quality of vision due to blurred vision, glare, halos, photophobia, or diplopia can benefit considerably from IOL exchange. This intervention can lead to significantly improved BCVA, both for distance and near vision. The main drawback of exchanging a multifocal for a monofocal IOL is the reduction in spectacle independence for reading.

When spectacle independence is important, a monovision strategy is also an option. This approach creates monocular far and near vision. Although this avoids problems caused by multifocal IOL designs, it can be accompanied by decreases in stereopsis, contrast sensitivity, and visual field.\textsuperscript{13,14}

The preoperative assessment of patients’ subjective complaints is crucial and should include refractive errors such as hyperopic shift and ametropia, decentration or tilt, increased glare,\textsuperscript{15} and aberrometry. Based on these preoperative tests, multifocal IOL exchange can be proposed if spectacle correction, contact lens wear, or surface laser treatment are not options to help the patient more conservatively.

Our preferred method of IOL implantation is the bag-in-the-lens approach. When this is performed as a primary intervention, sizing of the anterior capsulorrhexis\textsuperscript{16} and IOL centration can be accomplished by aligning with the Purkinje reflections.\textsuperscript{16,17} As a secondary intervention, centration in this matter with the BIL is not possible, although this is less problematic if a monofocal BIL is implanted.

In most eyes with previous Nd:YAG laser capsulotomy, an anterior vitrectomy will be necessary due to vitreous loss caused by rupture of the anterior vitreous hyaloid. Although complications are rare, a choroidal hemorrhage did occur in one eye in this series.

In conclusion, IOL exchange can be proposed for patients who are unhappy with multifocal IOLs and can result in a clear improvement in visual acuity; however, a BIL IOL could be implanted in only 70% of eyes in this study. The postoperative result was the same in all BIL IOL-implanted eyes, as shown in Figure 2.

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(Continued on page 80)
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