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CORRESPONDENCE

Sir,
Primary black intraocular lens selection

We read with interest the recent report by Shonibare and Lochhead[1] describing a patient with visual confusion who suffered troublesome visual ghosting following primary implantation of a near-infrared (NIR)-transmitting black IOL. Secondary implantation of a NIR-blocking Artisan black IOL abolished the patient's symptoms.

Simultaneously—and independently—we reported an identical experience in a patient with intractable diplopia who required a secondary NIR-blocking Artisan IOL to suppress debilitating visual ghosting.[2]

NIR light is assumed imperceptible to humans, yet perception of light is almost universal in patients following NIR-transmitting black IOL implantation.[3] In all, 91% of patients perceived light post-operatively, the remainder had acquired optic neuropathies with impaired long-wavelength spectral sensitivity and consequently could not perceive NIR light.[3]

Taken together, these observations suggest that careful and systematic evaluation of both patient factors and black IOL properties are necessary to identify the optimal primary black IOL implant pre-operatively in each patient to minimize the risk of treatment failure.

First, patient factors should be considered including the necessity of posterior segment monitoring, need for absolute light occlusion, scotopic pupil size, lens status, and optic nerve pathology (Table 1). Second, the properties of each black IOL, including optimum surgical configuration, occlusive optic size, and utility in primary and secondary IOL implantation must then be considered (Table 2). Black intraocular lenses are variably occlusive to NIR light and may be usefully categorized by this property.[4]

High levels of post-operative satisfaction have been reported with NIR-transmitting black IOL implantation,[5] although emerging reports of treatment failure do advise some caution.[1–3] Predicting this risk pre-operatively is critical to the long-term efficacy of surgical intervention. Design of a NIR-transmitting black contact lens would permit a therapeutic trial to determine pre-operative NIR light sensitivity where uncertainty exists. Primary implantation of a NIR-blocking IOL would be advised if troublesome ghosting occurred.

SLO/OCT posterior segment imaging remains a distinct clinical advantage in patients with NIR-transmitting black IOLs and may improve long-term safety. However, informed consent in this context must raise the possibility of treatment failure and need for secondary NIR-blocking IOL implantation in this patient group.

Table 1 Summary of patient factors relevant to primary Black IOL selection in eligible patients

Patient factor	*Impact on surgical planning*
Requirement for SLO/OCT posterior segment imaging	Patients requiring posterior segment monitoring (known choroidal naevus, family history of choroidal melanoma, documented posterior segment disorders, and so on) may benefit from a NIR-transmitting black IOLs to retain the utility for SLO/OCT posterior segment imaging. SLO/OCT may be used to confirm structural integrity of the macula before black IOL explantation.
Need for absolute light occlusion	Patients with diplopia or visual confusion may be intolerant of small quantities of threshold wavelength NIR light across the occlusive implant, particularly in sunlight or around incandescent light sources. This is not relevant in patients with leucocoria in whom NIR-transmitting black IOLs are recommended.
Pupil size	Pre-operative scotopic pupillometry is essential in all patients to objectively measure maximum pupil size. Large scotopic pupil diameters >6 mm require selection of a black IOL with a larger occlusive optic to prevent para-optical light leakage between lens and iris which may lead to treatment failure.
Lens status	Phakic patients may undergo primary black IOL implantation within the capsular bag unless large pupil diameter necessitates a larger black IOL within the ciliary sulcus. Primary black-on-clear polypseudophakia has been described to facilitate black IOL explantation should the fellow eye meet visual failure. Dual PMMA black and clear IOLs are recommended in this context. Pseudophakic patients may benefit from a piggyback secondary black IOL in the sulcus/capsular bag to remove the need for IOL explantation.
Optic nerve status	Patients with congenital or acquired optic neuropathies may have reduced spectral sensitivity to long-wavelength red light. The Farnsworth–Munsell 100 hue test may be used to objectively demonstrate this pre-operatively. In this patient group, NIR-transmitting black IOLs are recommended.

Abbreviations: IOL, intraocular lens; NIR, near-infrared; OCT, optical coherence tomography; SLO, scanning laser ophthalmoscopy.

Table 2 Technical details of all black intraocular lenses in clinical use

Manufacturer	*Model*	*Material*	*Foldable*	*Optic size*	*SLO/OCT imaging*	*Risk of NIR light perception*	*Black-on-clear primary polypseudophakia*	*Use as primary black IOL implant*	*Use as secondary black-on-black IOL implant*
NIR-transmitting black IOLs									
Morcher GmbH	85F	Tinted PMMA	No	6 mm	Yes	Yes	Yes	Capsular bag/ciliary sulcus/scleral fixation	Yes—piggyback in ciliary sulcus
Morcher GmbH	6S	Tinted PMMA	No	10 mm	Yes	Yes	No	Ciliary sulcus only	Yes—piggyback in ciliary sulcus
Morcher GmbH	Lotus 80D	Tinted hydrophobic	Yes	6 mm	Yes	Yes	Yes	Capsular bag only	No
Morcher GmbH	34D	Tinted PMMA	No	7 mm	Yes	Yes	Yes	Ciliary sulcus/capsular bag	Yes—piggyback in ciliary sulcus
Morcher GmbH	81D	Tinted PMMA	No	7 mm	Yes	Yes	Yes	Ciliary sulcus/capsular bag	Yes—piggyback in ciliary sulcus
NIR-blocking black IOLs									
Ophtec	Artisan iris-claw 201	Polycarbonate	No	5.4 mm	No	No	No	Iris fixation	Yes—iris fixation
Dr Schmidt Intraokularlinsen	MS 612 black	Tinted silicone elastomer	Yes	6 mm	No	No	Yes[a]	Capsular bag	No
Dr Schmidt Intraokularlinsen	MS 714 PB black	Tinted silicone elastomer	Yes	7 mm	No	No	No	Ciliary sulcus only	Yes—ciliary sulcus

Abbreviations: IOL, intraocular lens; NIR, near-infrared; OCT, optical coherence tomography; PMMA, polymethyl methacrylate; SLO, scanning laser ophthalmoscopy.
Implants are categorized by NIR-transmitting properties. The compatibility with posterior segment SLO/OCT imaging, risk of unwanted NIR light perception, compatibility with primary black-on-clear polypseudophakia surgical configuration, anatomical location for primary black IOL implantation, and utility for secondary black IOL implantation are specified for each implant.
[a]Caution advised as foldable black IOL may degrade over time in a piggyback surgical configuration with a PMMA IOL.

Conflict of interest

The authors declare no conflict of interest.

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Sir,
Sterile postoperative endophthalmitis following HOYA IOL insertion

Cataract extraction and intraocular lens (IOL) insertion is the most commonly performed operation on elderly people in Europe.[1]

In February 2013, HOYA (HOYA Corporation, Singapore, Singapore) recalled certain IOLs due to concerns with postoperative inflammation.[2] We describe the first case of sterile postoperative endophthalmitis secondary to a HOYA IOL, requiring explantation.

Case report

A 44-year-old man presented for left cataract assessment, with a known history of Fuchs' heterochromic cyclitis. On examination, visual acuity was 6/18 with stellate keratic precipitates and cells in the anterior chamber. He had posterior subcapsular lens opacification and a normal fundus.

He underwent phacoemulsification with a +21.5-D HOYA iSert 251 IOL (HOYA Corporation) inserted. He missed his follow-up appointment and presented 3 weeks postoperatively complaining of pain, having prematurely stopped his postoperative maxitrol drops. His visual acuity was hand movements with corneal edema, anterior chamber inflammation and a 1-mm hypopyon. B-scan revealed vitritis and a flat retina.

The patient commenced hourly dexamethasone 0.1%, cyclopentolate 1% three times a day, chloramphenicol 0.5% four times a day, and 400 mg oral moxifloxacin once a day. An aqueous and vitreous biopsy with intravitreal antibiotic (vancomycin and ceftazadine) was performed. No organisms were grown on subsequent culture of the biopsy.

As the intraocular inflammation persisted, oral steroid (40 mg prednisolone daily) was started; however, this failed to control the inflammation. Six weeks postoperatively, in light of HOYA's recall, the lens was explanted, with concurrent intravitreal triamcinolone (0.1 ml) and intracameral cefuroxime (1 ml). The explanted IOL was returned to HOYA for analysis, the results of which are pending. The inflammation improved the following day, with complete resolution in 1 month. Three months later, following posterior chamber Alcon AcrySof IOL (Alcon, Inc., Fort Worth, TX, USA) insertion his visual acuity was 6/6.

Comment

HOYA voluntarily withdrew a cohort of IOLs (including HOYA iSert 251 lenses) after review of their manufacturing process revealed residual metallic particles on these IOLs.[2] The cause was identified, rectified, and HOYA is now manufacturing these IOLs with appropriate regulatory approval. Our patient's intraocular lens was identified within this cohort.

On the basis of persistent inflammation despite intensive topical and oral steroids, and its swift resolution following explantation of the IOL, we felt the inflammation was due to the IOL rather than a postoperative episode of Fuchs' heterochromic cyclitis-related uveitis. We therefore present the first reported case of sterile postoperative endophthalmitis following HOYA IOL insertion.

Conflict of interest

The authors declare no conflict of interest.

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