

Brown discoloration of acrylic hydrophobic intraocular lens

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ABSTRACT • RÉSUMÉ

Objective: We report a case series of brown discoloration of Abbott Medical Optics, USA, acrylic intraocular lens (IOLs; AABOO, ZCBOO, and ZMBOO) after cataract operation.

Design: Retrospective case series.

Participants: Patients with brown discoloration of their IOLs postoperatively during the period from March 2013 to October 2013 at the Singapore National Eye Centre were consecutively identified.

Methods: Distance best-corrected visual acuity (BCVA), intraocular pressure, slit-lamp examination, colour fundus photographs, flare meter reading, endothelial cell count, dilated fundus examination, as well as colour discrimination test on the Lanthony D 15 Hue test were performed.

Results: Sixteen eyes of 14 patients were found to have evenly brown discoloration of varying degrees of acrylic IOL postphacoemulsification. This included 11 AABOO IOLs, 3 ZCBOO IOLs, and 2 ZMBOO IOLs. All had uneventful surgery except one who required anterior vitrectomy for posterior capsule rupture. One patient had uneventful operation but subsequently developed pigment dispersion glaucoma with tunnel vision and required a trabeculectomy. Mean time from operation to reporting date was 143 days (range 1–327 days). Pre- and postoperative month 6 BCVA was logMAR 0.54 and logMAR 0.13, respectively. None of the patients had loss of lines of BCVA. The desaturated Lanthony D 15 Hue test was abnormal in 8 out of the 16 eyes. None required IOL explantation.

Conclusions: Varying degrees of brown discoloration may occur in today's modern hydrophobic acrylic IOLs.

Objet : Faire état d'une série de cas de coloration brune de lentilles intraoculaires (AABOO, ZCBOO et ZMBOO) d'Abbott MedicalOptics (États-Unis) après une chirurgie de la cataracte.

Nature : Étude de cas rétrospective.

Participants : Des patients dont les lentilles intraoculaires (LIO) ont pris une coloration brune après leur opération au Singapore National Eye Centre entre mars 2013 et octobre 2013 ont été inscrits consécutivement.

Méthodes : Ont été consignés ou effectués : meilleure acuité visuelle corrigée (MAVC) de loin, pression intraoculaire (PIO), examen à la lampe à fente, photographies couleur du fond d'œil, tyndallogétrie laser (laserflameter), comptage des cellules endothéliales, examen du fond d'œil avec dilatation et test D 15 de Lanthony (distinction des couleurs).

Résultats : Pour 16 yeux de 14 patients, des LIO acryliques ont pris une coloration brune uniforme, d'intensité variable, après la phacoémulsification : 11 lentilles AABOO, 3 lentilles ZCBOO et 2 lentilles ZMBOO. Tous les patients avaient eu une chirurgie sans complication sauf un, qui a dû subir une vitrectomie antérieure pour rupture de la capsule postérieure. Un patient avait eu une intervention sans complication, mais a développé par la suite un glaucome pigmentaire avec vision tubulaire qui a nécessité une trabéculéctomie. Le temps écoulé moyen entre l'opération et la date de constatation était de 143 jours (étendue : 1 à 327 jours). La MAVC était de 0,54 (Log MAR) avant l'opération et de 0,13 (Log MAR) 6 mois après l'opération. Aucun des patients n'a perdu de lignes d'acuité visuelle. Le test D 15 désaturé de Lanthony était anormal pour 8 des 16 yeux. Aucun cas n'a nécessité l'explantation de la LIO.

Conclusions : Une coloration brune d'intensité variable peut se développer dans les LIO modernes en acrylique hydrophobe.

Intraocular lens (IOL) optic opacification and discoloration may result from external environmental causes or intraocular factors that react with the IOL material.¹ It is important to distinguish between discoloration and capsular opacification as this can avoid unnecessary procedures such as a neodymium-doped yttrium aluminium garnet (Nd: YAG) capsulotomy. One of the earliest reports on discoloured IOLs was by Milauskas.² In this series, there were 15 cases of brownish discoloration of silicone IOLs. Since then, there have been other reports of brown, blue,³ and green discoloration.⁴ Most have been case reports and mainly of silicone IOLs. There were no reports of major visual problems or IOL explantations.

We report a case series of 16 eyes of 14 patients with acrylic hydrophobic IOLs implanted that were noted postoperatively to have developed a brownish discoloration. To the best of our knowledge, this is one of the largest case series of discoloured acrylic IOLs to be reported.

METHODS

This is a retrospective case series of patients who underwent phacoemulsification surgery at the Singapore National Eye Centre. The study was performed in accordance with the ethics standards of the institutional research board and with the 1964 Helsinki declaration. Patients were

consecutively identified with brown discoloration of their IOLs postoperatively during the period from March 2013 to October 2013. After the initial cases were discovered, ophthalmologists in the centre were asked to be vigilant for other similar cases. Slit-lamp photographs of the extremes of brown discoloration and information about the cases were made known to them. These cases were all referred to the cataract subspecialty service clinic for further evaluation.

The phacoemulsification surgeries were performed under topical or regional (lignocaine 2% and hyaluronidase admixture) anaesthesia through temporal clear corneal incisions. The IOLs were injected into the capsular bag filled with dispersive viscoelastic (Viscoat, Alcon). Postoperatively, the patients received topical antibiotics (levofloxacin, moxifloxacin, or tobramycin eye drops) and topical corticosteroids (prednisolone acetate or betamethasone eye drops). The eye drops were tailed down over a month at the discretion of the attending doctor. The patients were reviewed postoperatively on days 1, 5–7, and 28–42 and examined for visual acuity, intraocular pressure (IOP), and slit-lamp microscopy. In particular, attention was paid to the clarity of the cornea, anterior chamber activity, wound integrity, as well as IOL positioning and clarity. From month 1 onwards, the patients underwent refraction as well as dilated fundus examination. The follow-up there after varied from 3 to 6 months after the initial surgery.

Patients who were identified postoperatively to have brownish discoloration of the IOLs were referred to the cataract team for further management. For consistency, a single observer (S.-P.C.) graded the degree of brownish discoloration of the IOLs, referencing the LOCS III scale. Distance best-corrected visual acuity (BCVA), IOP, slit-lamp examination, colour fundus photographs, flare meter reading, endothelial cell count, dilated fundus examination, as well as colour discrimination test on the Lanthony D 15 Hue test were performed upon initial identification. These tests were repeated at 3, 6, and 9 months as well as 1 year thereafter for the first 9 patients. The remaining 5 patients had baseline investigations as well as tests at 3 months' visit. In patients with no changes from baseline, no further tests were performed. The patients were also questioned regarding colour, contrast, or visual acuity problems at each visit.

RESULTS

Demographics

Brownish discoloration was observed in the acrylic hydrophobic aspheric lens (Sensor 1 single piece IOL, AABOO; Tecnis single piece IOL, ZCBOO; and Tecnis 3 piece IOL, ZMBOO) implanted in these 16 eyes (5 left and 11 right eye) of 14 patients (6 males and 8 females). These lenses were all manufactured by Abbott Medical Optics, Illinois, USA. Mean age of the patients was 68.2 years (range 42–81 years). Of these 14 patients, there were 9 Chinese, 3 Indians, and 2 Malays. The surgeries were

Table 1—Patients' findings

Patient No.	Age/sex/race	Eye	Systemic/ocular comorbidities	Post-op visual acuity (Log MAR) at last visit	IOL model/discoloration	IOL power	AC cells (at 1 month post-op)	Flare meter (at time of diagnosis of discoloration)	D15 results (desat)	Significant difference in ECC/difference in fundus photograph between 2 eyes	Duration from op date to discovery (days)
1	79M/Malay	OS	DM, POAG OU	0.4	AABOO NS 5+	+20.0D	Occ	6.9 ± 6.4	Not sig	NIL	71
2	66F/Chinese	OS	DM, HPT, AF	0.18	AABOO NS 5+	+20.5D	Nil	5.1 ± 2.8	DCD	NIL	1
3	70F/Indian	OD	NIL	0.1	AABOO NS 3+	+24.0D	Nil	0.3 ± 0.2	NCD†	NIL	200
4	81F/Chinese	OD	HPT,IHD, Wet AMD	0.3	AABOO NS 2+	+19.0D	Nil	5.3 ± 2.4	DCD	NIL	70
5	54M/Malay	OD	HPT	0.3	ZCBOO NS 3+	+17.0D	1+	6.1 ± 1.6	Not sig	NIL	84
6	69F/Chinese	OD	OD PAC, OS PACG	0.3	AABOO NS 3+	+21.0D	Nil	5.8 ± 1.5	Tritan	NIL	35
7	61M/Chinese	OS	HPT, IHD	0	AABOO NS 2+	+19.0D	Nil	1.2 ± 0.8	DCD	NIL	220
8	42M/Indian	OD	DM	0	ZCBOO NS 5+	+20.0D	Nil	1.0 ± 0.4	NCD	NIL	101
9	80F/Chinese	OD	DM, HPT	0.3	AABOO NS 4+	+18.5D	Nil	4.1 ± 3.6	Not sig	NIL	285
10	57M/Chinese	OD	NIL	0.1	ZCBOO NS 4+	+21.0D	Nil	1.6 ± 1.2	NCD	NIL	327
11	78M/Chinese	OD	HPT, Hyperlipidemia	0	ZMBOO NS 3+	+20.0D	Nil	3.5 ± 2.7	DCD	NIL	167
		OS	As above	0	ZMBOO NS 3+	+20.0D	Nil	3.5 ± 2.9	NCD	NIL	153
12	79F/Chinese	OD	DM, HPT, HYP	0.1	AABOO NS 3+	+23.0D	Nil	1.4 ± 0.6	Telartan	NIL	291
13	65F/Indian	OD	DM, HPT, HYP	0	AABOO NS 4+	+20.5D	Nil	Not done	Not sig	NIL	60
14	75F/Chinese	OD	DM, HPT, HYP	0	AABOO NS 4+	+20.0D	Nil	0.8 ± 0.5	Telartan	NIL	261
		OS	As above	0	AABOO NS 2+	+20.0D	Nil	1.4 ± 1.0	Telartan	NIL	210

F, female; M, male; DM, diabetes mellitus; HPT, hypertension; HYP, hyperlipidemia; AF, atrial fibrillation; IHD, ischemic heart disease; Occ, occasional; NS, nuclear sclerosis; AMD, age-related macular degeneration. †Not significant if fellow nondiscoloured eye has the same colour defect. ‡Normal colour discrimination refers to abnormally expected as per normal population.

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