Pupillary block due to reverse implantation of a sulcus intraocular lens

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An 88-year-old woman with a history of complicated cataract extraction by phacoemulsification with sulcus intraocular lens (IOL) implantation developed pseudophakic pupillary block in the right eye after reverse implantation of the IOL. Postoperatively, the intraocular pressure (IOP) was persistently elevated. Chronic angle-closure glaucoma was diagnosed and treated medically. The patient presented 5 years later with acute pupillary block. The diagnosis of reverse IOL implantation was confirmed by ultrasound biomicroscopy. Intraocular lens repositioning, anterior synchleialysis, and Baerveldt tube shunt placement led to resolution of the pupillary block and well-controlled IOP.

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CASE REPORT

An 88-year-old woman with a history of complicated cataract extraction by phacoemulsification with sulcus intraocular lens (IOL) implantation developed pseudophakic pupillary block in the right eye after reverse implantation of the IOL. Postoperatively, the intraocular pressure (IOP) was persistently elevated. Chronic angle-closure glaucoma was diagnosed and treated medically. The patient presented 5 years later with acute pupillary block. The diagnosis of reverse IOL implantation was confirmed by ultrasound biomicroscopy. Intraocular lens repositioning, anterior synchleialysis, and Baerveldt tube shunt placement led to resolution of the pupillary block and well-controlled IOP.

CASE REPORT

An 88-year-old woman with a history of chronic ACG and complicated cataract extraction in the right eye presented to the glaucoma service with intermittent right-sided headache and severe right ocular pain, which had gradually worsened over 2 days.

Five years before presentation, the patient’s cataract surgery had been complicated by a large posterior capsule tear, necessitating anterior vitrectomy and implantation of a 3-piece IOL in the ciliary sulcus. On the first postoperative day, the IOP in the right eye was 54 mm Hg and the IOL haptic had subluxated into the anterior chamber. The IOL was repositioned at the slitlamp with a 30-gauge needle. There had been no evidence of glaucoma prior to the surgery; apraclonidine 0.5%, brinzolamide 1.0%, oral acetazolamide, and prednisolone acetate were started postoperatively. The elevated IOP persisted despite discontinuing prednisolone acetate 1.0% eyedrops. Gonioscopy of the right eye revealed narrow anterior chamber angles. Chronic ACG was diagnosed and treated with chronic latanoprost therapy.

On presentation, the patient had been on latanoprost 0.005% daily in both eyes but had stopped the medication 2 days earlier. The corrected distance visual acuity (CDVA) was 20/25 in the right eye. Goldmann applanation tonometry measured 26 mm Hg in the right eye and 11 mm Hg in the fellow eye. A shallow anterior chamber with 360 degrees of iris-to-cornea touch was noted. Evaluation of the IOL revealed a slightly tilted and anteriorly displaced 3-piece IOL in the sulcus that appeared to be in a reverse-S configuration (Figure 1, A and B). The angle was notably closed on gonioscopy. Humphrey visual field testing showed a dense superior arcuate deficit. Optical coherence tomography (OCT) of the retinal nerve fiber layer revealed diffuse thinning. The fellow eye had a normal Humphrey visual field and OCT retinal nerve fiber layer. Dilated fundus examination revealed an asymmetric cup-to-disc ratio of 0.9 in the right eye and 0.4 in the left eye and was otherwise unremarkable.
Pupillary block is an infrequent complication of posterior chamber IOL implantation. It can be caused by 360 degrees of posterior synechiae between the IOL and iris or, if the IOL is placed in the ciliary sulcus, by alteration of the anatomy of the anterior chamber angle.4 In the case of reversed IOL orientation in the sulcus, the anterior vault of a 3-piece IOL can cause the optic to be apposed to the posterior surface of the iris, leading to pupillary block. Although accidental reversal of the IOL is not a commonly reported cause of pseudophakic pupillary block, incorrect positioning of the IOL in the sulcus has been noted to occur in 1.3% of cases, even in experienced hands.5 All these situations can result in anterior chamber shallowing, IOP elevation, and subsequent ACG.

Our patient is unique in that she presented with acute chronic pupillary block glaucoma 5.5 years after the initial sulcus placement of the IOL. Similar to previous reports of pseudophakic pupillary block after sulcus IOL reversal, anterior displacement of the IOL optic was noted in the early postoperative period and was relieved by repositioning at the slitlamp. Although this technique has been reported,6 our case shows that in the long term, this approach may not reduce the risk for chronic glaucomatous damage. Laser peripheral iridotomy has been attempted in this setting, but based on the anterior segment UBM in our case, we believed the vaulted IOL would continue to push the iris diaphragm anteriorly and cause further peripheral anterior synechiae. Therefore, we recommend surgical repositioning.
of the IOL in the ciliary sulcus as soon as possible after reverse IOL implantation is recognized.

Anterior segment UBM is useful in the evaluation of pupillary block, plateau iris, IOL positioning, ocular trauma, and other ocular diseases involving the anterior segment.7 The technique has been used to determine IOL positioning and to elucidate the cause of reverse pupillary block.8–10 In a case study by Sathish et al.,11 anterior segment UBM helped diagnose iris bombe as the cause of pseudophakic pupillary block glaucoma 3 years after implantation of a 3-piece IOL in the bag. In our case, although the configuration of the haptic provided a clue to the etiology of pupillary block, anterior segment UBM confirmed that the IOL was causing anterior bowing of the iris and excluded other causes such as aqueous misdirection syndrome,11 bilateral ring cysts of the ciliary body,8 late-onset secondary pigmentary glaucoma,9 a thick Soemmerring ring, and anterior displacement of the ciliary body.12

Aydin et al.13 describe a case in which reverse implantation of a vaulted IOL in the ciliary sulcus led to pupillary block, the sequelae of which were resolved with neodymium:YAG laser peripheral iridotomy. Harsum and Low6 report the case of a patient who developed pupillary block after dilation was performed 4 weeks after reverse IOL implantation. It was resolved by repositioning the IOL at the slitlamp. Prior case reports have not shown the long-term follow-up of patients who had such temporizing measures.

Our patient required low IOP to manage advanced glaucoma. Surgery included placement of a Baerveldt 350 tube shunt with corneal patch graft in addition to goniosynechialysis and IOL repositioning. This treatment resolved the pupillary block and successfully controlled the patient’s IOP. All anterior segment UBM measurements, especially ACD, angle opening distance at 500 μm, and trabecular–iris angle, revealed significant improvement postoperatively. In normal subjects, mean anterior segment UBM measurements for ACD is 3.13 mm ± .37 (SD).14 Although our patient’s ACD was 1.74 mm during the episode of pupillary block, it increased to 2.83 mm following the procedure. The opening of the trabecular–iris angle increased 17 degrees both nasally and temporally. Thus, we conclude that the reverse implantation of the IOL led to both chronic ACG and acute pupillary block.

The aim of our case report is to remind surgeons to assess the position of the IOL in a case of pseudophakic pupillary block or when the IOP is persistently high postoperatively. Anterior segment UBM is a reliable method to assess IOL positioning in such cases. Temporizing measures may resolve acute pupillary block in such cases, but chronic glaucomatous changes can still occur. Early repositioning of the IOL could prevent progression of ACG and pupillary block.

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