Five patients presented to 3 university eye clinics with complaints of blurred vision in their pseudophakic eye after complicated intraocular surgery and were found to have reverse orientation of an AC IOL. Intraocular complications included posterior vaulting of the iris in all the patients, severely decreased vision in 4 patients, corneal edema in 3 patients, and cystoid macular edema in 1 patient. Penetrating keratoplasty was performed in patients with severe corneal edema, but the visual outcome was limited. Despite advancements in cataract surgery techniques and outcomes, there is a need for AC IOL implantation at times. However, infrequent use by ophthalmologists may lead to improper insertion. Physician awareness of proper AC IOL insertion can prevent vision-threatening complications and the need for additional surgery.

**Financial Disclosure:** No author has a financial or proprietary interest in any material or method mentioned.

*JCRS Online Case Reports 2013; 1:e53–e55 © 2013 ASCRS and ESCRS*

With the rapid advances in cataract surgery, the need for anterior chamber intraocular lens (AC IOL) implantation has decreased and ophthalmologists are placing these IOLs less frequently. Consequently, new ophthalmologists and residents leave training with less experience inserting these IOLs and seasoned ophthalmologists use AC IOLs less frequently and may become less comfortable with AC IOL insertion over time. However, complications with cataract extraction still arise for which an AC IOL has been shown to be an appropriate and safe IOL choice. Furthermore, physician unfamiliarity with proper insertion can lead to postoperative complications and, ultimately, poor visual outcomes.

This case series underscores the importance of proper AC IOL insertion by describing the ocular and visual complications of improper insertion. It also serves to increase understanding of proper insertion by highlighting key concepts related to AC IOL design that physicians can use to ensure proper insertion in the future.

**CASE REPORTS**

Five patients presented to 3 university eye clinics with complaints of blurred vision in their pseudophakic eye after complicated intraocular surgery. Examination revealed inverted orientation of open-loop AC IOLs (Kelman multiflex style) with posterior vaulting against the iris and irregular pupil in all 5 patients, corneal edema in 3 patients, cystoid macular edema (CME) in 1 patient, and poor visual acuity in 4 patients.

**Case 1**

A 64-year-old woman presented with corrected distance visual acuity (CDVA) of counting fingers after complicated cataract surgery. Examination showed a reversely oriented AC IOL that was vaulted posteriorly against the iris with...
an irregular pupil but without corneal edema (Figure 1). Additionally, the native lens was dislocated into the posterior chamber. The patient was scheduled to have IOL exchange and pars plana lensectomy but was lost to follow-up.

**Case 2**

A 60-year-old patient was referred for corneal edema after complicated cataract surgery via clear corneal incision. The CDVA was 4/200, and anterior segment examination revealed diffuse stromal edema and a clear corneal wound that had been enlarged to 6.0 mm with many nylon sutures intact. The anterior chamber revealed a reversely oriented AC IOL with posterior vault against the iris and an irregular pupil. Penetrating keratoplasty (PKP) with IOL exchange was performed. A postoperative vitreous hemorrhage secondary to diabetic retinopathy developed and despite pars plana vitrectomy, the patient did not regain good vision, presumably due to ischemic changes in the retina.

**Case 3**

A 31-year-old man was referred to the university eye clinic for corneal edema after traumatic retinal detachment repair. The CDVA was 6/200, and examination showed corneal edema and a reversely oriented AC IOL with posterior vault. During the retina surgery, the AC IOL had dislocated into the posterior chamber and was replaced incorrectly by the retina surgeon. Penetrating keratoplasty with IOL repositioning was performed. The visual acuity was limited due to macular folds.

**Case 4**

A 69-year-old man with history of complicated cataract surgery and AC IOL placement 2 months earlier with postoperative course complicated by retinal detachment was referred to the cornea service for corneal edema after repair of a retinal detachment by endoscopic approach. The CDVA was 20/200. Penetrating keratoplasty was performed and intraoperatively, an incorrectly positioned AC IOL with posterior vault was seen. The AC IOL was repositioned and PKP completed. Four months postoperatively, the patient’s CDVA was 20/80.

**Case 5**

A 71-year-old previously healthy man having cataract extraction was found intraoperatively to have zonular weakness and an AC IOL was placed. On postoperative day 1, the CDVA was counting fingers, presumably secondary to suture-induced astigmatism, and a reversely oriented AC IOL was seen. Laser peripheral iridotomy was performed. At 3 months, the CDVA was 20/25 without corneal edema. However, at 9 months, the CDVA had decreased to 20/100 and anterior chamber inflammation and CME were seen (Figure 2). The patient was treated with ketorolac tromethamine 0.5% (Acular) and prednisolone acetate 1.0% (Pred Forte) eyedrops with resolution of the CME and return of the CDVA to 20/25. He has
remained clinically stable for 26 months on 1 drop of ketorolac tromethamine 0.5% and prednisolone acetate 1.0% and has not required surgical repositioning.

**DISCUSSION**

The presentation of improper AC IOL insertion at 3 different universities suggests that this problem is more prevalent than we may believe. Infrequent use of AC IOLs by ophthalmologists and less experience during residency training may lead to improper insertion. The visual and ocular complications can be severe and include corneal edema, iritis, synechiae, CME, haptic externalization, and vision loss. All the patients in our series experienced at least 1 of these complications. The complications often lead to additional surgical interventions including IOL repositioning or IOL explantation and PKP in cases of severe corneal edema.3,4

Physician understanding of AC IOL design may assist with proper insertion long-term. The AC IOL has a planoconvex orientation, and the plano side is designed to sit flush against the iris (Figure 3). Reverse orientation causes iris vault, irregular pupil, and overall IOL instability because of the convex anterior design. It also causes chafing of the corneal endothelium by the IOL haptics, leading to corneal edema. Additionally, visual acuity may be optically limited by reverse orientation of the planoconvex IOL. When properly placed, the AC IOL should have a “Z” orientation, whereas incorrect placement results in an “S” orientation (Figure 4).3 Finally, an inserter is used for AC IOL placement and if the AC IOL is oriented incorrectly, it will not lie flat against the inserter. We advocate using these concepts to assist with proper AC IOL insertion as they can easily be evaluated intraoperatively with the microscope. Physician awareness of proper AC IOL insertion can prevent vision-threatening complications and the need for additional surgery.

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**Figure 3.** Planoconvex design of Kelman multiflex AC IOL.

**Figure 4.** Incorrect AC IOL orientation demonstrating “S” shape.