Spontaneous dislocation of a phakic refractive lens into the vitreous cavity

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A 36-year-old woman with high myopia had uneventful implantation of a phakic refractive lens (PRL) bilaterally. Two months postoperatively, the best corrected visual acuity (BCVA) in the right eye decreased to the preoperative level and the posterior chamber PRL disappeared from the anterior segment and was found lying in the vitreous cavity inferiorly. After lensectomy and pars plana vitrectomy, the PRL was removed through the initial clear corneal incision, improving the BCVA to 1.0. A zonular defect associated with high myopia, previously forgotten and unrecognized ocular trauma, or intraoperative manipulations may have resulted in the spontaneous dislocation of the PRL.

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Implantation of minus-power anterior chamber (AC) phakic intraocular lenses (IOLs) for the correction of myopia was introduced in the middle of the last century[1] but was abandoned because of a high complication rate. In the 1980s, a phakic posterior chamber IOL (PPC IOL) was introduced by Fyodorov and coauthors[2,3] to correct high myopia. Several lens designs and their subsequent modifications have attempted to reduce potentially serious complications caused by PPC IOLs (eg, cataracts[4] and pigment dispersion syndrome[5]).

The phakic refractive lens (PRL) (Medennium, Inc.), a modification of the initial design,[2] is a plate-haptic PPC IOL to correct moderate to high myopia and hyperopia. It is made of a hydrophobic, high refractive index (1.46), medical-grade silicone and has an ultrathin design. The PRL floats in the posterior chamber (PC) in front of the crystalline lens. Short-term PRL results are satisfactory in regards to efficacy, safety, and predictability in small studies (B. Philipson, MD, "PRL [Phakic Posterior Chamber IOL]–12-Month Results of the European Clinical Trial," presented at the XXI Congress of the European Society of Cataract & Refractive Surgeons, Munich, Germany, September 2003).[6,7] Complications of the PRL are rare and usually not visually significant.[7]

We describe spontaneous dislocation of a PRL into the vitreous cavity in a highly myopic patient 2 months postoperatively.

Case Report

A 36-year-old healthy woman presented for the correction of myopia. Preoperatively, the best corrected visual acuity (BCVA) was 0.30 in the right eye with -19.00 -1.00×170 and 1.00 in the left eye with a -16.00 diopters (D) sphere. Slitlamp biomicroscopy revealed deep ACs. No iridodonesis or phacodonesis was seen in either eye. The intraocular pressure was normal bilaterally, and fundoscopy findings were consistent with axial myopia. The central corneal thicknesses were 531 μm and 541 μm and the central keratometry was 43.75@172/45.25@82 and 43.50@22/45.00@112 in the right eye and left eye, respectively. The axial length was 34.06 mm in the right eye and 31.28 mm in the left eye. Because of the patient's high myopia, bilateral PRL implantation was suggested.

In July 2002, after informed consent had been obtained,

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a PRL (model 101, −13.50 D, 11.3 mm length, 5.0 mm optical zone) was implanted uneventfully in the right eye under peribulbar anesthesia as previously described.[6] Preoperatively, the pupil was dilated with tropicamide 1% and phenylephrine 2.5%. Through a 3.5 mm temporal clear corneal incision, the AC and PC were filled with hydroxypropylmethylcellulose 2% (HPMC), which was also injected between the iris and crystalline lens to create space for PRL insertion.

Two 1.0 mm paracenteses were made on each side of the main incision and almost 90 degrees from it. The PRL was grasped lengthwise with a titanium Dementiev implantation forceps (Duckworth & Kent) and inserted in the AC in front of the iris. The soft plate haptics of the PRL were then placed in the PC through the pupil with the help of 2 blunt spatulas pushing the haptics gently behind the iris, taking extra care to avoid pressure on the crystalline lens. After horizontal orientation of the PRL was verified, the HPMC was aspirated from the AC through the paracenteses using bimanual irrigation/aspiration and the pupil was constricted with acetylcholine chloride (Miochol®). A peripheral iridectomy was performed with a vitreotome introduced through a side port. The surgery was concluded by hydrating the corneal wounds with balanced salt solution (BSS®).

Postoperatively, the patient received acetazolamide 250 mg 4 times daily for 3 days and topical ofloxacin and dexamethasone 4 times daily for 1 month. At the 2-week follow-up, the uncorrected visual acuity (UCVA) was 0.10, the BCVA was 1.00 with −1.50 sphere, and the PRL was perfectly centred with a satisfactory vault (ie, distance between the PRL and the crystalline lens equal to the thickness of the PRL).

In August 2002, PRL implantation was performed uneventfully in the left eye using a similar technique. This improved the UCVA to 1.00.

Two months postoperatively, the patient returned on an emergency basis complaining of sudden, painless loss of vision in the right eye. The UCVA was hand motions, and the BCVA was 0.30 with −19.00 −1.75 × 90. The PRL could not be seen in the PC, and slight iridodonesis but not phacodonesis was detected mainly inferior. After mydriasis, the PRL could be seen lying in the vitreous cavity inferiorly. The retina was attached with no evidence of holes or tears. The patient denied head or ocular injury.

Lensectomy, pars plana vitrectomy, and removal of the PRL through the initial clear corneal incision were performed. Postoperatively, the UCVA in the right eye was 0.70, improving to 1.00 with +1.00 −1.00 × 160.

Discussion

Phakic posterior chamber IOLs were introduced in the late 1980s to prevent problems related to the poor design of AC IOLs. The haptics of PPC IOLs are inserted blindly behind the iris and, depending on the design, allow the IOLs to rest in the structures of the PC or float in it. Ultrasound biomicroscopy (UBM)[8] enables identification of the relationship of the PPC IOL optic to the crystalline lens and iris and of the haptics to peripheral PC structures. The haptics of various IOLs have been found in contact with the ciliary sulcus, ciliary body, peripheral iris, zonules, or floating freely.[9–12]

Garcia-Feijoó et al.[12] demonstrated zonule–haptic contact in 50% of eyes implanted with myopic PRLs and lens rotation up to 90 degrees in a significant number of eyes. Other studies (Jairo E. Hoyos, MD, PhD, et al., "Ultrasound Biomicroscopy Evaluation of the PRL," Ocular Surgery News, Europe/Asia-Pacific Edition, Supplement, March 2002, pages 11–13) have confirmed these findings. Similarly, Trindade and coauthors[10] showed haptic–zonule contact in 2 of 9 eyes with an implantable contact lens (ICL) (Staar Surgical AG).

Since the PPC IOL haptics may rest on the zonules, the integrity of the zonular apparatus is important when PPC IOL implantation is considered, particularly when high axial myopia is corrected, because of known zonular weakness in these eyes. Iridodonesis and phacodonesis, when present, are signs of zonular deficiency and should be carefully watched for. However, these signs may be absent even in the presence of small zonular defects. Occult zonular defects are the most common findings after mechanical injuries[13] and have been identified by UBM in 43% of eyes after ocular injury, although no eye had evidence of clinical zonular damage.[14] In a series of patients who required capsular tension ring insertion during cataract surgery for zonular weakness/defects, only 6 of 14 eyes had signs of loose or broken zonules preoperatively.[15] Thus, PPC IOL candidates should be questioned about previous ocular injury and the integrity of the zonules should be demonstrated preoperatively if there has been ocular trauma

Patients with Marfan's syndrome or other systemic diseases with known zonular weakness should not be considered candidates for PPC IOL implantation. Zonular defects that predispose a PPC IOL to dislocation into the vitreous cavity may also develop intraoperatively or postoperatively. Excessive pressure on the lens–zonule diaphragm by overfilling the AC with an ophthalmic viscosurgical device or by exerting pressure