Synchrony® pseudo-accommodating intraocular lens luxated into the vitreous cavity after injury

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ABSTRACT: The Synchrony® IOL is a single-piece, dual-optic, pseudo-accommodating lens. We present a clinical case of vitreous luxation of this lens two years after cataract surgery (phacoemulsification) without complications. A 23-gauge pars plana vitrectomy procedure was performed, the lens was elevated with perfluorocarbon liquid and luxated to anterior chamber. Given the large size of the lens, the haptics joining the two optics were cut in the anterior chamber, allowing the lens to be extracted with ease through a limbal incision. Finally, a three-piece lens was placed in the sulcus, with good postoperative outcome.

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Accommodation is a physiological process in which the eye changes its refractive power to focus on objects located at different distances from the retina. The loss of accommodation, or presbyopia, is the most common visual dysfunction, affecting most of the population over 40 years of age. Presbyopia is considered an important problem because it leads to complete loss of a physiological function roughly two thirds through an individual’s lifetime. Few physiological functions suffer such a significant and systematic deterioration at such an early age and on such a generalized basis.

Postoperative capsular fibrosis and capsular contraction after conventional cataract surgery anchor the IOL firmly in the capsule. Since the elasticity of conventional intraocular lenses (IOLs) is poor, they do not change their shape or curvature during contraction of the ciliary muscle, so accommodation is impaired in patients undergoing cataract surgery.

Attempts have been made to compensate for loss of accommodation with diffractive and refractive bifocal lenses as well as with trifocal lenses, with variable results. IOLs, called pseudo-accommodating IOLs, have recently been designed with flexible haptics that allow them to move within the eye and thus preserve accommodative power after cataract surgery. Pseudo-accommodating lenses are based on the anterior axial movement of the IOL optic in response to contraction of the ciliary muscle. Different models of pseudo-accommodating IOLs based on this axial optic movement have appeared on the market. Ultrasound biomicroscopy has shown that single-optic lenses move less than 1 mm forward during accommodative effort. In addition, single-optic pseudo-accommodating lenses with less refractive power will generate less “accommodation” with anteroflexion than IOLs with greater power. Other models were thus designed that attempted to better mimic the accommodation movement of a young natural crystalline lens.

The Synchrony® pseudo-accommodating IOL (Abbott Medical Optics) is an innovative single-piece, dual-optic, foldable silicone lens. It has a 5.5 mm anterior optic with positive dioptric power (+3.2 D) which is connected via haptics to a 6.0 mm posterior optic with negative power. The haptics have a spring-like movement that attempts to mimic the accommodative movement of the crystalline lens when placed within the capsular bag. We present a case of luxation into the vitreous cavity of this lens, which we consider to be of interest because a search of the literature has revealed it to be the first report of such a case.
CASE REPORT

A 72-year-old woman, with no history of interest, operated for cataracts in both eyes (BE) two years ago by phacoemulsification and implantation in the capsular bag of a Synchrony® pseudo-accommodating intraocular lens (dual-optic). Surgeries were performed without complications. She was seen in the emergency clinic of our department for sudden loss of vision in the right eye (RE) following ocular trauma after falling out of bed. Best corrected visual acuity (BCVA) was 0.62 (with addition of +12.5 D) in the RE and 1 (+0.5, −1 × 15°) in her left eye (LE).

Examination of the anterior pole of the RE revealed rupture of the posterior capsule with aphakia. In addition, on examination of the posterior pole, the Synchrony® intraocular lens was observed to be luxated into the vitreous cavity with the retina attached, and with no evidence of retinal breaks (Figures 1 and 2).

A 23G pars plana vitrectomy was performed and perfluorocarbon liquid was injected into the vitreous cavity allowing the lens to float on the surface of the perfluorocarbon and bringing the IOL behind the iris, where it was easily luxated to the anterior chamber using a forceps. Following this, and given the size of the lens, the haptics joining the two optics were cut with Vannas scissors separating the two optics, to facilitate the extraction of the lens. Both halves were extracted through a 5 mm limbal incision and anterior vitrectomy was performed. Finally, given that the anterior capsulorhexis was intact and there was good support, a three-piece lens was implanted in the sulcus followed by corneal sutures.

Twelve days after surgery, the patient had a BCVA of 0.8, the IOL in the sulcus was normally positioned and the rest of the examination was normal. At one year, BCVA was 0.9 (+0.75 −0.75 × 145°) (Figures 3 and 4). In the LE, pseudophakia was correct.
DISCUSSION

Despite excellent results in restoring vision following cataract surgery and IOL implantation, lack of accommodation after surgery still needs to be addressed. Pseudo-accommodating IOLs can help restore accommodation since they transform the contractile force of the ciliary muscle into an anterior movement of the optic along the visual axis, which in turn changes the refractive power of the eye.

Despite the tremendous advances made in cataract surgery over the years, IOL luxation into the vitreous cavity is a complication that is estimated to occur in 0.2%-3% of cases. Luxation can be either spontaneous or traumatic, and it can occur after both complicated and uncomplicated cataract surgery (as in our case). Numerous techniques for extracting a luxated IOL are described in the literature, but only in the case of a single optic. The luxated Synchrony IOL described in this case has a dual optic which would a priori seem enormously difficult to extract.

The Synchrony lens is a safe pseudo-accommodating intraocular lens with a rate of complications similar to that of single optic lenses. It can also be implanted without distortion or ovalization of the capsulorhexis and capsular bag, and has all the advantages of a dual but monofocal optic (greater contrast sensitivity and absence of halos).

This IOL was initially inserted with forceps because of the difficulty involved in folding it. An innovative injector was subsequently developed in which the lens is preloaded and ready for implantation through a primary incision of approximately 3.5 mm, without the need for suture, as in the case described here. This gives an idea of the enormous flexibility of the lens. The same characteristics that allow for easy insertion through a relatively small incision size for the dimensions of the lens also facilitate extraction.

Despite the apparently large size of the lens, it is very flexible and easy to handle. In this case, it was no more difficult to extract than a single optic lens.

REFERENCES


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