Surgical Technique

Phacoemulsification in phakic iris-claw lens with cataract

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In this new technique of cataract surgery in patients with iris-fixated phakic intraocular lens with cataract, phakic IOL is explanted at the end of surgery. Phakic IOL remains stable and securely enclaved to the iris during phacoemulsification which is performed through a small 2.2 mm incision. Endothelial protection is provided by viscodispersive OVD above the phakic IOL and space for surgery is created by high molecular weight viscocohesive OVD beneath the phakic IOL. This technique provides significant advantages from the previously described techniques in terms of chamber stability, endothelial protection, iris trauma and surgical ease.

Key words: Artisan, iris-claw, phacoemulsification, phakic

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Phakic intraocular lenses (PIOL) are being used for high refractive error.[1-5] In 2004, Food and Drug Administration approved the Artisan lens for correcting moderate to severe myopia ranging from- 5.00 to- 20.00 dioptres. Patients who have undergone iris-fixated lens in the past are now coming for cataract surgery. Since these Artisan PIOL are made of rigid polymethylmethacrylate, they require a large incision for removal. Foldable Artiflex lenses were introduced in the market in 2005.[6-9]

Various surgeons have described different techniques for removal of these lenses during cataract surgery. In 1997, Menezo *et al*.[10] and in 2009 de Vries *et al*.[11] performed phacoemulsification after explanting PIOL. In 2016, Kaur *et al*.[12] used femto-assisted cataract surgery. We describe a novel technique in which we perform phacoemulsification with foldable lens implantation in the bag while phakic lens is still enclaved to the iris. The 2.2-mm incision is enlarged to 6 mm to remove phakic lens. Incision is sutured at the end of surgery [Video 1].

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Three incisions were made: two side ports at 11'o and 2'o clock using micro vitreo-retinal blade and one main incision with 2.2-mm blade. Side ports were used to disenclave the lens at the end of surgery and perform bimanual irrigation and aspiration. After making side ports, viscodispersive ophthalmic viscosurgical device (OVD) Viscoat® (Alcon, Hünenberg, Switzerland) was injected on top of the PIOL for endothelial protection. High-molecular-weight viscocohesive OVD Healon GV® (Abbott Laboratories, Lake Bluff, IL, USA) was injected under the PIOL, and over the cataractous lens, to create space. A needle cystitome was used to create a central continuous curvilinear capsulorhexis [Fig. 1a]. Phacoemulsification was performed using Centurion® Vision System (Alcon) with the following settings: intraocular pressure of 55 mmHg, aspiration flow rate of 55 ccs/min, vacuum of 450 mmHg, and torsional phacoemulsification power ranging from 20 to 60 with intelligent phacoemulsification setting enabled [Fig. 1b]. Irrigation and aspiration was performed with a coaxial system for cortex removal [Fig. 1c]. Anterior chamber was formed with a dispersive OVD whenever the chamber became shallow. In our case [Fig. 2], AcrySof® IQ Monofocal IOL (Alcon) was implanted in the bag [Fig. 1d and e]. We injected intracameral acetylcholine (Myochol; Ciba Vision, Duluth, GA, USA) to constrict the pupil. With the OVD in the anterior chamber, the phakic lens was disenclaved from two side ports [Fig. 1f]. The main incision was enlarged from 2.2 to 6 mm to remove the phakic lens [Fig. 1g]. The main incision was secured with one 10-0 monofilament suture. Irrigation and aspiration was performed using bimanual to remove the residual viscoelastic [Fig. 1h]. Side ports were hydrated to stabilize the anterior chamber [Fig. 1i].

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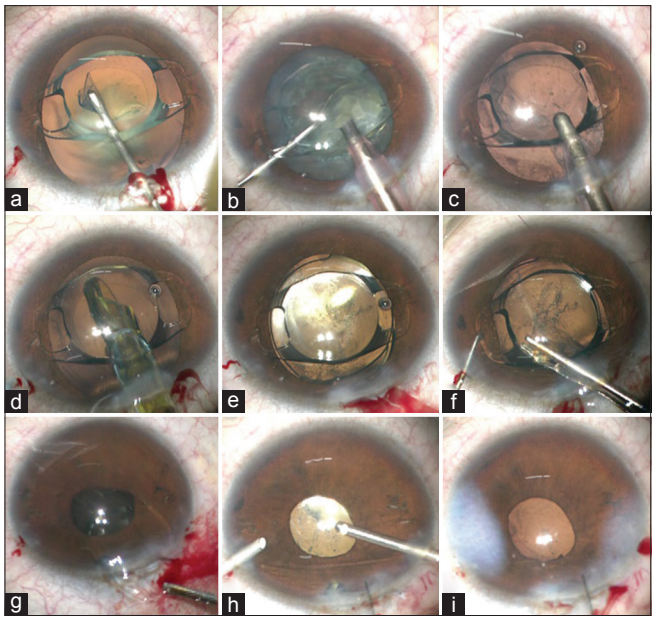

Figure 1: Intraoperative (a) Anterior capsulorhexis. (b) Phacoemulsification. (c) Irrigation and aspiration. (d) Intraocular lens insertion in bag. (e) Both phakic and pseudophakic intraocular lens. (f) Disenclaving haptic. (g) Phakic intraocular lens removal. (h) Irrigation and aspiration. (i) End of surgery

Preoperative best-corrected visual acuity was 0.5 LogMAR unit, while postoperatively day 1, it was 0.3 LogMAR unit, associated with few Descemet's folds and a tight suture. The preoperative specular count was 1053 cells/mm^2. At 6 months postoperatively, it was recorded as 1027 cells/mm^2. There was no postoperative iris atrophy, pupil deformity, or prolonged inflammation.

Discussion

Our technique has some benefits as we performed phacoemulsification and IOL insertion in the bag through the 2.2-mm incision using standard technique maintaining a stable anterior chamber throughout the procedure. Performing cataract surgery after phakic lens removal and incision closure with a suture which we did earlier had two major issues; first, the iris gets irritated during disenclaving causing pupil to constrict causing problems during the procedure. Second, there were higher anterior chamber fluctuations as these eyes were highly myopic. We even tried putting tight suture to stabilize anterior chamber, but that leads to striations on the cornea leading to loss of chamber clarity. PIOL explant at the end of the surgery does away all these problems.

The usage of viscocodispersive OVD above and viscocohesive OVD below the phakic lens provides a shell for endothelial protection and creates space between the crystalline and phakic lens. Since the phakic lens was well enclaved and sandwiched between OVDs, it did not flutter during the entire surgical procedure, especially phacoemulsification and cortical aspiration. The disenclavation of haptic before phacoemulsification will cause the lens to move around and cause pupillary constriction as well as endothelial touch. Disenclaving

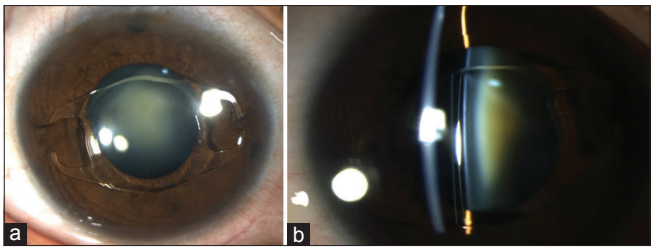

Figure 2: Preoperative (a) diffuse illumination on slit lamp. (b) Cross-sectional view on slit lamp

only one haptic as described by Kaur *et al*. will keep the lens fixed on one side and the disenclaved side may lead to movement of the lens during phacoemulsification and cortical aspiration and might lead to iris trauma or endothelial damage.

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Conflicts of interest

There are no conflicts of interest.

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