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Advances in phakic posterior chamber lenses

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Dear Friends
Season's Greetings!!

For the last two decades, laser keratorefractive surgeries like PRK, LASIK have become popular. Highly optimized and customized laser treatments such as wave front – guided and topography –guided ablations have been introduced.[1] The real limitations of such refractive surgeries are corneal thickness, curvature, corneal topography irregularities and tissue remodeling.[2] The keratorefrective surgery is not always safe and may be associated with certain complications such as keratectasia, corneal haze, regression and dry eye etc.

Implantation of intraocular lens in phakic eye (pIOL) is relatively new, safe and effective technique to correct moderate to high myopia and hypermetropia in cases where corneal refractive procedures are contraindicated.[3] Posterior chamber pIOLs are implanted in slit like potential space between the posterior surface of the iris and the anterior surface of crystalline lens. Posterior chamber pIOL have overcome the complications related with foldable iris-claw pIOL and angle supported pIOLs. Currently two models of posterior chamber pIOLs are available, the Implantable Collamer Lens (ICL) and Phakic Refractive Lens (PRL). The Implantable Collamer Lens (ICL) is most widely used safe and stable pIOL. It is the only pIOL that is approved by United States Food and Drug Administration (FDA) for the treatment of moderate to severe myopia.[4] ICL is made of increased biocompatible materials known as Collamer (0.2% Collagen and 60% hydroxylethyl methacrylate copolymer) which attracts deposition of fibronectin on the IOL surface which inhibits aqueous protein binding and makes the IOL invisible to immune system.[5] Phakic Refrective Lens (PRK) is made of ultrathin, highly purified, optically clear silicon but limitation of PRL implants is the size of limited optical zone.

pIOL has reversibility, high optic quality in myopic patients due to retinal magnification and it preserves the corneal architecture and correction is not limited by corneal topography or thickness.[6] pIOLs are not free from complications, though complications are more common with angle supported and iris fixated anterior chamber pIOL. Complications in posterior chamber pIOL related to insufficient vault or excessive vault size of pIOL are anterior subcapsular cataract, pigment dispersion, and pupillary block glaucoma.[7]

Now a days incidence of ICL related cataractogenesis have decreased due to properly vaulted V 4 design of lens and improved surgeons learning curve and skill. Selection of appropriate ICL diameter is most vital step of pIOL implantation. Poor vaulted (< 250 µm) ICL leads cataract formation and oversized ICL (>750µm) increases risk of pigment dispersion, angle closure and pupillary glaucoma. As in ICL haptics rest in the ciliary body sulcus, measurement of sulcus to sulcus length with the help of high resolution ultrasound biomicrooscopy is needed. Assessment of zonular configuration is another crucial pretreatment test as contact of haptic with fragile zonule may lead to zonular dehiscence.

Although ICL implantation can be considered safe and effective method for moderate to high refractive errors but further research is needed to establish the long term safety of ICL and lens design should be focused on toric pIOLs as spectacle dependency returns at presbyopic eye.

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