The Outcome of Management of High Myopia by Intraocular Collamer Lens

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Abstract

Purpose: To evaluate the outcome of treatment for high myopia by posterior phakic intraocular lens lens implantation

Setting: ophthalmology department, Sohag UniversityHospital, Sohag Faculty of Medicine.

Methods: 23 eyes of 16 highly myopic patients were included in the study. The mean age was 25.4 years (range 18 to 35 years), the mean spherical equivalent (SE) -14.64 diopters (D) (range 8 to 28 D), , 23 eyes of 16 patients received posterior chamber phakic IOL (ICL) 10 females and 8 males the age ranges from (18-35 years).

Results The spherical equivalent refraction at the last examination was within 1.0 D of the targeted refraction in 22 eyes (91.3%) and within 0.5 D in 11 eyes (47.8%). Onecase (4.3%) complained of glare in the Ist week postoperative which improved, One case (4.3%) develpoed anterior subcapsular cataract after 1 year.

Conclusion: Surgical management of high myopia byposterior chamber phakic IOL (ICL) , is safe and predictable

INTRODUCTION

order aberrations following laser in situ keratomileusis (LASIK) or implantation of PIOL to correct high myopia has been investigated by wavefront examination by Sarver et al [(2)].

High myopia has always been a refractive challenge. Surgical techniques based on modification of corneal curvature, which became very popular in the last decade, fall short of correcting high refractive errors. Complications include lack of predictability, regression, corneal ectasia, and introduction of high order optical aberration [(1)]. Alternative surgical procedures that leave the corneal plane intact, like clear lens extraction and phakic intraocular lens (IOL) implantation, have been revived in part due to recent advances in technology.

The optical consequences of corneal refractive surgery are now well known and limit today its clinical indications. On the contrary, PIOLs respect the cornea and have a predictable behavior. Image quality and higher

PATIENTS AND METHODS

Study design: prosepective, nonrandomized study

Setting: Ophthalmology Department , Sohag University Hospital

Patients:

Twenty three eye of sixteen highlymyopic patients were included in the study. The mean age was 25.4 years(range 18 to 35 years), the mean spherical equivalent (SE) -14.64 diopters (D) (range 8 to 28 D).

The patient selection criteria

- Age more 18 – 40 years,
- Myopia equals or more than -8 D
- Corneal refractive surgery is contraindicated.

and 7 males the age ranges from (18-35 years).

Surgical technique

Implantable collamer lens insertion

All ICL implantations were done under general anethesia, The ICL is well-suited to a temporal clear cornea, Approach 3.2 mm. Paired 1.0-mm paracentesis incisions are placed at the 6:00 and 12:00 positions, the viscoelastic is injected into the anterior chamber. Methylcellulose , The preloaded injector mechanism is brought into the operative field, and the tip of the cartridge is inserted into the clear cornea wound . Using gentile posterior pressure, the footplates are tucked one at a time under the iris., the pupil is pharmacologically constricted with Miochol (Novartis, Cambridge, Mass). A peripheral iridectomy is done using a vitreous cutter.

Postoperative care and follow up:

All cases are examined at one day , one week, one months, 6 months, 12 months and 18 months postoperative as routine vists, visual acuity , IOP evaluation , refraction, stabiltiy of the IOL , detection of any complications, All patients were advised to contact us and apply for an extra visit any time they feared a possible complication.

- No eye pathology (maculopathy, cataract, uveitis, and glaucoma

Methods

All patients had been examined, slit lamp anterior segment examination to exclude anterior segment pathology, IOP had measured to exclude any rise of IOP, dilated full retinal examination to exclude maculopathy , retinal holes or tears by indirect ophthalmoscopy and panfandoscopic lens, fluorescein angiography and macular OCT has been done in suspicious macula, and negative cases only included in this study.

Manifest and cycloplegic refraction are recorded; UCVA and BCVA are examined, Scheimflug imaging has been done to evaluate the anterior chamber depth, corneal k reading and white to white diameter, white to white is reevaluated manually by a caliber. 2 cases revealed peripheral retinal tears and received retinal argon laser photocoagulation. The patients had been divided to three groups depends on the patient choice after explaining the issues of each surgery , and anterior chamber depth (AC depth) had been taken in consideration, 23 eyes of 16 patients received posterior chamber phakic IOL (ICL) 9 females

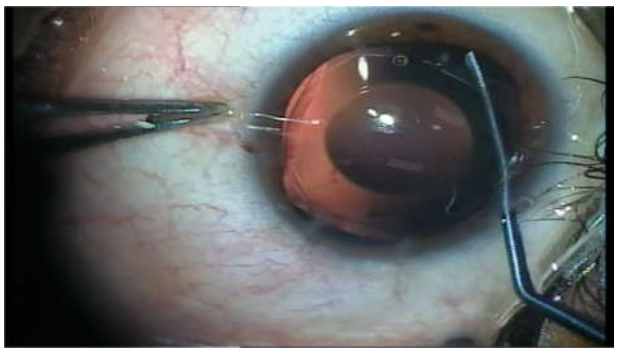

Figure (1) shows the implantation of The ICL below the iris

Results

Refractive outcome and postoperative UCVA were analysed as the efficacy of the procedure . The refractive outcome at 1 day, 1 week, and 1, 6, 12, and 18 months were analyzed. The refractive outcome in patients with at least a 1-month follow-up was evaluated as the primary measure of refractive stability. The efficacy index is calculated (the mean postoperative UCVA after 1 month / the mean preoperative BCVA).

Refractive Outcome

At 1 month, the mean spherical equivalent refraction was -0.099 D ± 0.839 (SD) . The spherical equivalent refraction at the last examination was within 1.0 D of the targeted refraction in 22 eyes (91.3%) and within 0.5 D in 11 eyes (47.8%).

Intraocular Pressure

After (ICL insertion), the mean preoperative IOP was 13.9 ± 2.6, the mean IOP at 1 day posoperative is 22.79 ± 5.79 , at 1st week it was 18.56 ± 4.34 and became 16.12± 3.09 mm Hg at I month, to be 14.47 ± 2.14 mmHg at 6 months and 14.10 ± 1.88 mmHg at 12 months , 14.05± 2.17 mmHg at 18 months.

Visual Acuity

After (ICL PIOL) insertion , the preoperative best corrected visualacuity (BCVA) was 47.8% ≥ 0.4 , the visual acuity was ≥ 0.2 in 91.3 % of cases and ≥ 0.4 in 30.4 % in the 1st day postoperative, which increased to 43.4% of cases ≥0.4 after 1st week to increase after 1st month postopertive to 56,5 %≥0.4 , 52.1% after 6 months, 52.1% are ≥ after 12 months, to be 47.8 % after 18 months postoperative.

The difference between the preoperative BCVA and postopertive UCVA after one month. Is shown in table 1

Table 1 shows the difference between the Preoperative BCVA and posoperative UCVA after 1 month and the efficacy index is calculated.

Preop BCVA	**0.434 + 0.165**
Postop UCVA at 1 month	**0.429+ 0.155**
P value	**0.846**
Efficacy index= $^{Postop\ UCVA}/_{preop\ BCVA}$	**98.8%**

UCVA= uncorrected visual acuity, BCVA= Best corrected visual acuity

Complications:

In this study (implantable contact lens PIOL) , 4 cases 17.3% of cases developed increased IOP > 21 mmHg in the 1st day postoperative and 3 of them the IOP decreased after 2 weeks with topical treatment and one continued till 3 montns on topical comination of antiglaucoma (timolol & dorzolamide).One case (4.3%) complained of glare in the Ist week postoperative which improved markedly later on, One case (4.3%) develpoed anterior subcapsular cataract after 1 year.

DISCUSSION:

Patients with high myopia are often welling to have a refractive procedure performed to become spectacle or contact lens independent . Our study tried to asses the efficacy and safety of the posterior chamber phakic IOL (star collamer vision ICL).

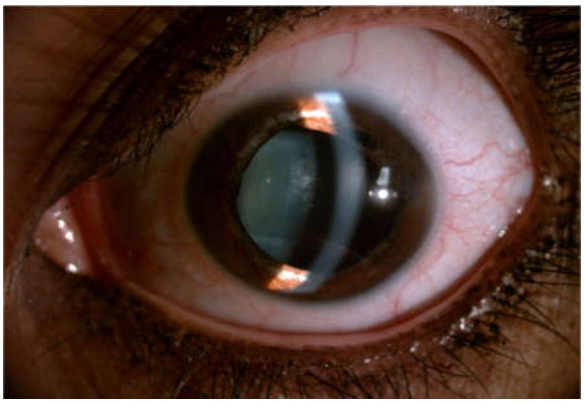

Figure (2) shows anterior subcapsular cataract after ICL

In our study there was statstically significant change in the early postopertive period in the 1st month although of a patent peripheral iridectomy .That is mostly atrributed to resuidal visolelastic and a slightly larger ICL diameter than actual W-t-W daimeter which may be due to an error inthe measurment (mainly by caliper), which coincides this with shallow AC depth and increase vault ofthe ICL, but the shallow AC after that improved much after 1 week and IOP decrease considerably and vault decrease which may be due to absorption of the remainning of viscoelastic subtance and adapation of posterior chamber to the newly implant, other study done by Stephen S. Bylsma et al[٣], reported pupillary block glaucoma in the 1st week after ICL implantation which aggressive antiglaucoma medications were applied followed by peripheral iridectomy, he also reported mechanisms other than phakic PC IOL pupillaryblock may elevate IOP, remaining anterior chamber viscoelasticblock. When viscoelastic material remains anterior tothe phakic PC IOL, high IOP results from impairedoutflow through the trabecular meshwork. This conditionis managed by aggressive ocular hypotensive therapyuntil the IOP returns to normal, signaling theclearance of the viscoelastic material from the anteriorchamber[٣]. Laurent Kodjikian et al [٤], reported a case of postoperative malignant glaucoma which did not respond to medical treatment, and surgical aspiration of vitreous with ICL removale was needed. Others reported postoperaive corticosteriod glaucoma [٥], pigment dispertion glaucoma [٦].

One case 4.3 % develop anterior subacapsular cataract associated with nuclear cataract after 6 months postoperative which is mostly due to either operative trauma or chronically inadequate aqueous perfusion or chronic inflammation. a study [٧]A meta-analysis of cataract development after posterior chamber pIOL surgery

found an overallincidence of cataract formation to be 9.60 % [٨],The 3-year data of the U.S. Food and Drug Adminstration of Posterior chamber PC IOLs, Found , cataract of anterior subcapsular opacities of 2.7% [٩] In another study The incidence of anterior subcapsular (AS) opacities was 7.7%, and no eye developed clinically significant cataract during the mean follow-up of 13.2 months[١٠].

One case 4.3% complained of transient glare which mostly due to large periphaerl iridectomy.No repoerted case of vitreoretinal complications.

CONCLUSION

Surgical management of high myopia may be of great help to the patient for a better quality of life, and the the posterior chamber phakic IOL is effective and safe for high myopia

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