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Our Experience with Supraphob Regen Trifocal Iol: Patient Satisfaction with Vision Quality Aad Spectacle Independence

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Abstract:

To assess vision parameters and patient satisfaction after implantation of Supraphob Regen; a trifocal intraocular lens (IOL).

Methods: Study is Observational and retrospective cohort type with 36 eyes of 18 subjects. All patients undergone bilateral implantation within 7-30 days with corneal astigmatism less than 0.75 and cataract less than nuclear sclerosis grade 4. Binocular and uniocular uncorrected distance visual acuities (UDVA), intermediate (UIVA) and near (UNVA) were measured. Simultaneously post operative manifest refraction, binocular contrast sensitivity (CS) with patient expectation with need were assessed post operative 1 month with questionnaire.

Results: Postoperative Snellen's visual acuity ranges were: binocular UDVA 6/9 to 6/6 (0.18 to 0.0 LogMAR), binocular UIVA 6/12 to 6/6 and Binocular UNVA N-8 to N-6. Contrast sensitivity in bright light conditions and low light conditions (with and without glare), remained within the limits of normality. One patient (5.5%) needed glasses for near vision. Rest none of the remaining patients were dissatisfied and unhappy with implantation of IOL.

Conclusions: The Supraphob Regen trifocal IOL has shown excellent results in all patients. 94.44% of the patients experienced spectacle free life and were highly satisfied.

Introduction:

Cataract incidence is more in human being age more than sixty. As the life expectancy is increasing globally with advance technology and no preventive measures available for cataract, its removal by advance method(phacoemulsification)has become amongst the most common surgery performed worldwide now also it will continue to increase in frequency over next years. In addition, cataract surgeries are performed even in lesser grades and at younger ages because indications of cataract has changed drastically as patients in their fifties have higher demands for spectacle free life. Also phacoemulsification for refractive purpose has gain attraction more frequently as this can ameliorate the need of glasses relatively till advance age. Expectation amongst patients for near and intermediate distances after cataract surgeries now can be possible to meet through bifocal IOLs and recently with trifocal IOL which can make patients more happy post implantation. Many models had been marketed in last decade with reasonable satisfaction for both near and intermediate but Supraphob Regen Trifocal has experienced the higher satisfactory visual acuity for distant, intermediate and near distances.

Supraphob Regen Trifocal IOL (Appasamy Associates Private Limited) is a premium biocompatible hydrophobic Acrylic Trifocal IOL with design aimed at improving intermediate and near vision tasks to



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increase patient satisfaction. 21 squared waves diffractive rings with diffractive refractive optics(central 5 mm diffractive zone with peripheral 1 mm refractive zone) theoretically does not make it pupil size dependent. Central 1.1 mm zone dedicated for intermediate vision creates third focal point at 75 cm of intermediate distance. The purpose of this work was to establish stress free vision with seamless transition of optic design for intermediate and near vision range.

Materials and methods:

The inclusion criteria for this database were: diagnosis of cataract, corneal astigmatism 0.75 D, bilateral implantation of Supraphob regen trifocal lens, minimum follow-up of 6 weeks, and second eye implantation binocularly within 7-30 days from first eye. The exclusion criteria were: glaucoma, age-related macular degeneration, diabetic retinopathy, maculopathies, amblyopia, vascular alterations of the retina, past history of corneal or intraocular surgery, epiretinal membranes, and complications during or after the phacoemulsification procedure(no complications occurred in surgery patients).

This was a retrospective, observational study involving all patients who were enrolled after considering inclusion and exclusion criteria. 36 patients underwent bilateral crystalline lens surgery by phacoemulsification at a single centre with two surgeons experienced more than 15 years had implanted trifocal IOL, the Supraphob regen. The implantation of these lenses was performed after the extraction of cataract with phacoemulsification technique and patients were aimed at emmetropia post operatively. The 18 patients of the study underwent the surgical technique of phacoemulsification with 2.2 mm incision in clear cornea under topical anaesthesia with Proparacaine(0.5%). The main outcomes measured were uniocular and binocular uncorrected distance visual acuity (Binocular UDVA) measured at 6 meters, binocular uncorrected intermediate visual acuity (Binocular UIVA) measured at 75 cm, binocular uncorrected near visual acuity (Binocular UNVA) measured at 40 cm. Other primary outcomes were: percentage of patients with binocular UDVA, UIVA and UNVA of 20/25 or better.

Results:

Total 36 eyes of 18 patients with trifocal IOL (Supraphob Regen) implant in both eyes, were included. There were 17 men and 18 women. Average age was 63.7+/-10.2 years (range 53 to 74 years). Follow-up time was 11.9 +/-4.8 months (range 1.25 to 25.7 months). Dioptric power of IOL to be implanted has a mean of 22.01 +/-2.07 D (range 18.0D to 26 D). 11 patients showed binocular UDVA equal to 20/20 (61.1%). 17 of 18 patients (94.4%) achieved binocular UDVA of 20/25 or better. No patient had binocular UDVA lower than 20/30. 16 patients (88.8%) achieved 20/25 or better binocular UIVA measured at 75 cm. 16 patients (88.8%) achieved N-8 or better binocular UNVA measured at 40 cm. 2 of the patients presented bin- ocular UNVA of N-10 but none of patient presents with binocular UNVA less than N-10 The final postoperative refraction at the last follow up visit was spherical equivalent of -0.5 +/- 0.75 D (range -0.5D to +1.25 D).

Discussion:

Multifocal (both bifocal and trifocal) IOLs were designed to give independence from the glasses means to see near and distance both clearly without glasses and without asthenopia. But this platform has an intrinsic inherent biophysics: light entering into eye divides to different focus due to multiple and different steps on optics of IOL. So different focal point of differently diverted lights will creates different image quality on retina. Despite that the results with newer multifocals are progressively better with higher



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satisfaction rates. Initially models were bifocal, with a distant and near focus (35 or 40 cm). However, with increasing patients demands and expectation for intermediary works like computers , cooking watching televisions etc trifocal IOL comes into play. In a meta-analysis recently published, the authors concluded that the uncorrected intermediate visual acuity (UIVA) was significantly lower in the group with the bifocal IOLs than in those patients with trifocal IOLs. On the other hand, no differences were found with respect to the need of spectacles independence, and satisfaction of the patients, when comparing bifocal against trifocal IOLs¹.

The (Supraphob Regen Trifocal IOL, Appasamy Associates Private Limited) is a single-piece IOL, with a trifocal platform and a diffractive-refractive optics, contains a diffractive structure in central 5 mm of the anterior surface, with 21 squared wave diffractive rings that surround a small central refractive zone dedicated for intermediate vision approximately 1.1 mm in diameter. In addition, it has 1 mm of peripheral refractive zone beyond the diffractive rings. At the IOL plane this platform has an addition of +1.75 D for intermediate distance working distance of 75 mm and a maximum add of +3.5 D for near vision, representing approximately +1.35 D and +2.55 D at the corneal plane after implantation, respectively, for the average pseudophakic anterior chamber depth of a human eye.

The Supraphob regen Trifocal IOL has higher Modulation Transfer Function(MTF) which ensures optimum image contrast irrespective of pupil size. Contrast sensitivity was not found to be altered in photopic (high luminance) conditions, maintaining its limits of normality for the age group. However, with scotopic (low luminance) conditions results were equivocal and need further evaluation.

Direct questionnaire regarding patient satisfaction and visual function assessment in the present study was very high. 17 out of 18 (94.44%) patients responded that their vision with Supraphob Region IOLs did not cause any difficulty in their everyday life and none responded that they had great or very great difficulties. Additionally, 15 out of 18(83.33%) of the individuals questioned said that they felt very satisfied with their vision; remaining 3% felt overall satisfied with 1 patients was fairly satisfied as patient has to wear glass for near. None responded that he/she was dissatisfied to any degree.

As the study involved less patients but despite reporting a higher visual acuity without correction on an average so far not a single patient indicated that they would not choose that same IOL. Data about contrast sensitivity is not documented at last most visit of patients enrolled in study ,but they did not mentioned any impairment about contrast sensitivity. About glare and haloes when enquire many patients approximately 14 out of 18 reported about it.

Gundersen & Potvin reported better intermediate uncorrected visual acuity at 60 cm over period of six months after surgery in individuals with other trifocal platforms but did not find discrepancies at other distances² This results are grossly similar with Supraphob Regen Trifocal IOL but no comparative studies. Böhm et al. made a study comparing four presbyopia-correcting platforms with regard to their defocus curves: Panoptix, AT Lisa tri (Zeiss), Mplus X (Oculentis), and the so-called "extended depth of focus" Tecnics Symfony (Abbott Medical Optics)³. They found several differences at specific distances. Few platforms were better at distance corrected Intermediate distance acuity but poorer near vision acuity while others with distance corrected are better nearer acuity but poorer intermediate acuity. Supraphob Regen Trifocal IOL has demonstrated good range of intermediate and near vision acuity at full distance correction.

Recently (2019) in a literature review Sudhir et al. established that the existing evidence suggested that in general good visual results, along with a high degree of independence of spectacles, were attained with



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many other trifocal IOL also like the FineVision, PanOptix, AT LISA and Tecnis Symfony IOLs. However, the results are yet to be compared with these other Multifocal iol platform.^{4.}

A weakness of the present study was that the measurements of visual acuity (both uncorrected and corrected during manifest refraction examination, and distance-corrected during defocus curve determination) were not done beyond the 20/20 line. Therefore, many patients who possibly could read the 20/15 line were not detected, and the average of visual acuity could be in fact better than shown. Also the intermediate distance of 50-60 cm is not analysed with this Supraphob Regen Trifocal IOL. In addition, other factors that may affect visual quality were not analyzed (i.e. IOL centration, kappa angle, alpha angle). Additional studies are warranted.⁵⁻⁷

In conclusion, the trifocal intraocular lens Supraphob Regen showed very satisfactory results in this group of patients, who achieved independence of the glasses and expressed a high level of satisfaction.

Bibliography:

- S Jin, DS Friedman, K Cao, M Yusufu, J Zhang, J Wang, S Hou, G Zhu, B Wang, Y Xiong, J Li, X Li, H He, X. Wan. Comparison of postoperative visual performance between bifocal and trifocal intraocular lens based on randomized controlled trails: a meta-analysis. BMC Ophthalmol, 19 (2019), pp. 78
- 2. KG Gundersen, R. Potvin. Trifocal intraocular lenses: a comparison of the visual performance and quality of vision provided by two different lens designs. Clin Ophthalmol, 11 (2017), pp. 1081-1087
- 3. M Böhm, K Petermann, E Hemkeppler, T Kohnen. Comparative analysis of defocus curves of four presbyopia-correcting intraocular lenses with four designs: diffractive panfocal, diffractive trifocal, segmental refractive and extended depth of focus. J Cataract Refract Surg, 45 (2019), pp. 1625-1636
- 4. RR Sudhir, A Dey, S Bhattacharrya, A. Bahulayan.AcrySof IQ PanOptix intraocular lens versus extended depth of focus intraocular lens and trifocal intraocular lens: a clinical overview. Asia Pac J Ophthalmol (Phila), 8 (2019), pp. 335-349
- 5. V Fuentes-Mendoza, V Galvis, A Tello, JP Aparicio, B. Sánchez. [Spherical acrysof restor vs. aspherical acrysof restor: centering and effect on the objective and subjective visual quality of the patient]. Rev. Sociedad Colombiana de Oftalmologia., 42 (2009), pp. 887-900
- 6. DH Chang, Waring GO 4th. The subject-fixated coaxially sighted corneal light reflex: a clinical marker for centration of refractive treatments and devices. Am J Ophthalmol, 158 (2014), pp. 863-874
- 7. X Zhu, W He, Y Zhang, M Chen, Y Du, Y. Lu. Inferior decentration of multifocal intraocular lenses in myopic eyes. Am J Ophthalmol, 188 (2018), pp. 1-8