Quality of life evaluation after implantation of 2 multifocal intraocular lens models and a monofocal model

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PURPOSE: To compare vision-related quality of life using the National Eye Institute Visual Function Questionnaire (NEI VFQ-25) in patients with 1 of 3 types of intraocular lenses (IOLs) and to correlate it with postoperative visual outcomes.

SETTING: Vissum Corporation–Instituto Oftalmológico de Alicante, Alicante, Spain.

DESIGN: Comparative case series.

METHODS: This study comprised eyes having cataract surgery with bilateral implantation of a monofocal IOL (Group A), apodized multifocal IOL (Group B), or full diffractive multifocal IOL (Group C). Distance and near visual acuities, contrast sensitivity, and quality of life were evaluated preoperatively and postoperatively.

RESULTS: The study enrolled 106 eyes (53 patients; age range 49 to 80 years). All groups had significant improvement in uncorrected and corrected distance visual acuities postoperatively ($P \leq .05$). Near vision outcomes were significantly better in Groups B and C ($P \leq .01$). Groups B and C had significantly less difficulty in some near tasks, such as reading the newspaper (A–B, $P = .02$; A–C, $P = .02$) or reading bills (A–B, $P = .04$; A–C, $P = .004$). Group C also had significantly less difficulty driving at night than Group B ($P < .01$). Near visual acuity and contrast sensitivity were significantly correlated with difficulty in near visual tasks in Groups B and C. Night-driving difficulty correlated significantly with contrast sensitivity in Group B.

CONCLUSIONS: Patients with multifocal IOLs could perform several daily tasks at near and intermediate distances, with less night-driving limitation with the full diffractive IOL than with apodized multifocal and monofocal IOLs.

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The visual impairment caused by cataract can lead to a significant reduction in patients' quality of life. Driving, reading, or performing other daily-life activities that depend on visual performance can become extremely difficult for these patients.[1] The goal of modern cataract surgery is to achieve fast visual rehabilitation without complications and with low postoperative residual refractive errors,[2] which would have a significant positive impact on the patient's quality of life. New intraocular lens (IOL) designs aimed at restoring not only visual function at distance but also at near have been developed and introduced into clinical practice. This would theoretically provide complete visual restoration, allowing the patient to successfully perform normal activities of daily living. Multifocal IOLs[3] generate different foci in an attempt to solve the visual limitation at near and intermediate distances that occurs with classic monofocal IOLs. Indeed, multifocal IOLs have been shown to provide near and distance functional vision without the need for corrective lenses.[4–10]

Optical side effects, such as decreased contrast sensitivity, glare disability, and halos, have been reported with some multifocal IOL models.[11–16] These effects can significantly affect the patient's visual performance and thus the patient's satisfaction and quality

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of life. Some patients with significant visual improvement after surgery are very dissatisfied with the outcomes because their expectations were not met or their postoperative visual quality is limited. For this reason, the visual acuity measure is not sufficient to confirm a successful outcome after cataract surgery.[17–20] Vision-specific, health-related quality-of-life instruments can be used as complementary tools for evaluating the general outcomes of a specific modality of cataract surgery. They have been shown to be valid instruments to evaluate the functional impairment related to vision.[21]

The 25-item National Eye Institute Visual Function Questionnaire (NEI VFQ-25) measures the self-reported, vision-targeted health status of people with chronic eye disease.[22–24] This questionnaire measures the effect of visual disability and visual symptoms on general health, such as emotional well-being and social functioning. It also measures the extent to which the eye disease affects a patient's ability to live without pain, work productively, and interact with loved ones.[25] The NEI VFQ-25 has been used with people who are free of eye disease as well as with those who have a specific ocular pathology, such as age-related macular degeneration, cataract, glaucoma, and Graves ophthalmopathy.[23,25,26] It has also been used to evaluate subjective visual function changes after various intraocular procedures, such as cataract or macular hole surgery.[27] Therefore, the NEI VFQ-25 is useful for measuring health-related quality of life in patients with various eye diseases and treatments.

The aim of the current study was to compare the vision-related quality of life using the NEI VFQ 25 questionnaire in patients with 1 of 3 types of IOLs—2 multifocal models and 1 monofocal model—and to correlate it with postoperative visual outcomes.

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PATIENTS AND METHODS

Patients

This prospective case series comprised eyes of bilateral cataract patients. All patients were adequately informed and signed a consent form. The study adhered to the tenets of the Declaration of Helsinki and was approved by the local ethical committee.

The inclusion criteria were cataract (Lens Opacity Classification System III[28]: NO1, C1, P1, or more severity) causing a significant reduction in visual quality, older than 45 years, and a minimum education level (reading ability). The exclusion criteria were active ocular disease and astigmatism higher than 3.00 diopters.

Cataract patients who came to Vissum Instituto Oftalmológico de Alicante for consultation were randomized to receive bilateral implantation of 1 of the 3 IOL models using random-number sequence software. All patients received the same IOL model in both eyes (ie, no mix and match).

Surgical Technique

All surgeries were performed by 1 of 3 experienced surgeons (J.L.A, J.L.R-P., J.J.) using the same standard technique of sutureless microincision phacoemulsification and the same protocol. All patients received topical anesthesia before surgery. Adequate dilation was obtained with intracameral mydriasis. The incision was placed on the axis of the positive corneal meridian. After the microincision was created, the incision was enlarged to approximately 3.0 mm for IOL implantation. Postoperative topical therapy included a combination of topical antibiotic and steroidal agents.

Intraocular Lenses

The monofocal IOL in this study was the Acri.Smart 48S (Carl Zeiss Meditec AG). This single-piece spherical foldable acrylic IOL has a 25% water content in its fully hydrated state and hydrophobic surfaces.[29] It has a biconvex–equiconvex 5.5 mm optic with a total diameter of 11.0 mm. Patients with this IOL were assigned to Group A.

One of the multifocal IOLs in this study was the AcrySof ReSTOR SN6AD3 (Alcon Laboratories, Inc.), which is designed to provide quality near to distance vision by combining apodized diffractive and refractive technologies.[8,9,13,30–32] The center of the IOL surface consists of an apodized diffractive optic (3.6 mm diameter) that focuses light for near through distance. The refractive region of the IOL bends light as it passes through the IOL to a focal point on the retina. This outer ring of the IOL surrounds the apodized diffractive region and is dedicated to focusing light for distance vision.[8,9,13,30–32] Patients with this IOL were assigned to Group B.

The other multifocal IOL in this study was the Acri.LISA 366D (Carl Zeiss Meditec AG), which is an aspheric bifocal biconvex refractive–diffractive design.[5] This single-piece IOL has an optic diameter of 6.0 mm and an overall diameter of 11.0 mm. The surface is divided into main zones and phase zones; the phase zones assume the function of the steps of diffractive IOLs and have a mean refractive power corresponding to the zero diffractive power of the main zones. The incident light is distributed with 65% to distance focus and 35% to near focus.[5] Patients with this IOL were assigned to Group C.