Third-generation gradient multifocals effective for pseudophakic implantation

PRELIMINARY clinical results of third-generation multifocal gradient refractive-index optic IOLs without a transition zone are effective and safe for pseudophakic implantation, "said Tatyana Morozova MD, PhD of the Fyodorov Eye Surgery Complex in Moscow, Russia, at the XXV Congress of the ESCRS.

The preliminary clinical phase I study indicated that third-generation multifocal gradient IOLs without transition zone are effective and safe for pseudophakic implantation. Further research is ongoing, Dr Morozova said.

"Multifocal gradient optic IOLs without a transition zone are effective and safe for pseudophakic implantation"

She reported a non-randomised prospective study that included 11 eyes of 10 patients who received multifocal gradient optic IOLs without a transition zone. Surgery was performed using the phaco-chop technique.

The surgeons followed the patients for one month after cataract surgery. The mean patient age was 66 years, ranging from 54-77 years. The postoperative outcome parameters included uncorrected visual acuity (UCVA) and best corrected visual acuity (BCVA) for far and near. The investigators also measured the defocus curve and contrast sensitivity.

Dr Morozova evaluated pseudoadjustment amplitude by blurring the patients’ 10/20 visual acuity with the addition of spheres. She assessed subjective vision with the VF14 questionnaire that included questions pertaining to overall satisfaction with visual acuity and that related to spectacle dependency.

The postoperative distance UCVA averaged 0.76 and the mean distance BCVA was 0.90. Dr Morozova reported. Near BCVA was 0.9 or better in all eyes. Mean near UCVA was 0.64. The mean pseudoaccommodation amplitude was 5.25 D.

The questionnaire revealed some interesting results. Ninety-one per cent of the patients did not use glasses for near vision during their daily activities, including reading for long periods. They reported good vision at intermediate distances and indicated high levels of satisfaction without glasses, at night, and overall. The questionnaire revealed only one case of optical phenomena out of the 10 patients.

Dr Morozova explained that in a previous clinical trial conducted at her clinic, which involved foldable IOLs with double refractive index optics, patients achieved a mean distance UCVA of 0.65 and mean distance BCVA of 0.87 D.

The mean near UCVA in this trial was 0.60 and the mean near BCVA was 0.89. The contrast sensitivity was reduced and 86 per cent of patients did not use glasses for near vision during their daily activities, including reading. The mean amplitude of accommodation was 4.75 and optic phenomena were visually significant in 10.7 per cent of cases.

The main problem in this earlier study was photopic phenomena that were not noted by the physicians before cataract surgery, she said. Adequate preoperative patient selection for multifocal correction and uncomplicated surgery are required for multifocal optic lenses with a transition zone, she observed.

The optical part of the third-generation gradient refractive optic IOL is composed of two polymers with different indices of refraction. The power difference between the optic components is -4.0 D. Unlike previous models, there is no transition zone between optic zones for far and near.

Up-to-date technology enables surgeons to provide a foldable multifocal IOL model with closed haptics and a gradient optic part. The chemical technology of gradient manufacturing is associated with step-by-step frontal photopolymerisation and the application of a special liquid photo hardening material with variable refractive indices. After polymerisation, the liquid composition of the oligomers is transformed into a cross-link structure.

The multifocal gradient IOL optical part is a compound made out of an inner and outer component. The inner component is for far vision and the outer component of the 6.0mm optic is for near vision. The optical part of the elastic gradient IOL contains a combination of a photo hardening material, oligorethanmethacrylate, which has refractive indices of 1.4795 and 1.520. The lenses involve the use of two prefabricated sets of transfer molds.

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Tatmorozova@yandex.ru
morozova.tatyana@yahoo.com

Stefanie Petrou Binder MD

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