Author’s response to reviews

Title: Prospective comparative study of tolerance to refractive errors after implantation of extended depth of focus and monofocal intraocular lenses with identical aspheric platform in Korean population

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Dr. Guangde Tu
Editor, Biomed Central UK

Re: Manuscript, “Prospective comparative study of tolerance to refractive errors after implantation of extended depth of focus and monofocal intraocular lenses with identical aspheric platform in Korean population”
Dear Dr. Tu,

thank you for your e-Mail of May 30th, 2019, regarding our manuscript. We are pleased at the positive reception of our work. Below we provide a point-by-point response to your comments:

Reviewer #1:

“The difference between this study and the existing EDOF IOL study is the following from the authors' conclusions. ‘Regarding the postoperative refractive tolerance to SE, the Tecnis Symfony IOL showed better tolerance to residual postoperative refractive error than the monofocal IOL with the same material and optical platform.’ These results are different from what we normally expect. The authors have cited the advantages of the EDOF IOL by citing existing literature on EDOF in the discussion part, but these descriptions are local and I believe that the author's inferences and hypotheses related to these results should be presented in the discussion part.”

Thank you for your comment. We now added another reference, which also showed similar findings: Carones compared the impact of induced astigmatism on the visual acuity in four different types of multifocal lenses and observed the highest tolerance in the Symfony IOL, which retained good visual acuity (0.7, decimal scale) even with an induced astigmatism of -1.50 D (Page 14, Lines 324-327).

“As the authors agree, depending on the size of the pupil, the depth of focus can change, compensating for residual refractive error and sometimes giving better visual acuity. In other words, what I would like to say is that I want to ask if the pupil size of subjects before the study is controlled and analyzed. Please describe your answers in detail in the Results and Discussion sections.”

In this study, we did not find any statistically significant difference in the pupil size (KR-1W, Wavefront Analyzer, Topcon, Tokyo, Japan) between the two groups before and after surgery when measured under the same intensity of illumination (p>0.05). We added these data to the Results section (Page 10, Lines 217-222).
Reviewer #2:

“Abstract: in methods, authors should say whether this was a randomized or non-randomized study.”
- Thank you for your comment. We now added this point in Page 2, Line 26. Although this was a non-randomized study, it was a prospective one in which we enrolled all qualified patients within a certain period of time. As it is the patient who ultimately decides which type of an IOL (monofocal or EDOF) he or she desires, the nature of this trial does not actually allow a “fully randomized study” design. However, all patients fulfilled the in- and exclusion criteria.

“In the results, please provide a head to head comparison of the distance, intermediate, and near visual acuity in the two groups with p values.”
- As the primary outcome of the monofocal group was not visual restoration in near distances, we did not measure the intermediate or near visual acuity values.

“In the results section of the abstract, authors should mention whether the first two lines are the overall results or particularly about one the groups, presumably the EDOF group. In the last line of results, please provide the mean SE in each group in addition to the p values.”
- We now added the according data in the Results section of the Abstract.

“The conclusion mentions patient satisfaction, though there is no mention of this anywhere else in the abstract.”
- The patient satisfaction results have now been added to the Results section of the Abstract.
“The fact that the EDOF is more tolerant to residual refractive error is not at all a surprise and can be attributed to the design of the IOL.”

As in the study cited above, it is true that it has already been published about the tolerance of various bifocal or trifocal lenses using different optical platforms towards residual refractive error. However, the main focus of this study was to clinically assess the difference in the tolerance to the residual refractive error between an EDOF lens and a monofocal lens that share the same aberration-correcting optical platform.

“Introduction: Authors do not provide any literature on whether similar studies have been done in the past. Even if not done, authors should highlight this fact i.e. a lacuna in literature in the introduction in itself.”

- We now added this point to Page 4, Lines 71-72.

“Methods: Please mention whether this was a non-randomized or randomized study, though the former appears more likely. Though appears to be no randomization, authors should have used a masking technique to improve the robustness of the study design.”

- Thank you for your comment. Please refer to our answer above. And as you indicated, future studies should use a masking technique to increase the reliability of the results.

“Results: It appears that the postop spherical equivalent was twice as much in the EDOF group compared to the monofocal group. Is there an explanation for this? Did authors target a more myopic refraction in the EDOF group to compensate for the lack of good near vision which is well reported with the Symfony?”

- In the EDOF group, we used the micro-monovision technique, aiming for ca. -0.4 to -0.6D in the second eye. In optical bench tests, it has been shown that the Symfony IOL demonstrates similar or higher energy peak at more myopic foci with small pupil sizes. In this clinical trial, we observed similar results.

“Results should be catered more towards comparison between the groups rather than the overall result. All tables should contain data from the EDOF and the monofocal group for comparison.”

- Thank you for your comment. However, we believe that we already stated all data of both EDOF and monofocal groups wherever it was necessary and possible.
“The discussion also needs to be more goal directed towards tolerance of refractive residuals by the EDOF and the technical and design reasons of why this may be. These points should be covered right at the beginning of the discussion.”

- The EDOF lenses such as the Symfony IOL were designed to provide an increased depth of focus from far to intermediate range to allow for spectacle-free daily activities, and one of the major advantages of such lenses lies within its high tolerance to residual refractive error as it has also been observed in previous studies. The key finding that we report in this study is the Symfony IOL’s high tolerance to residual refractive error compared to its monofocal counterpart that uses the identical aberration-correcting optical platform.

Thank you again for your assistance with our manuscript. Please let us know if further issues arise.

We look forward to hear from you.

Sincerely yours,

Chul Young Choi, MD, PhD
Corresponding Author