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RESPONSE TO LETTER

Axial Length Correction in Evaluation of Refractive Predictability and Biometry Agreement [Response to Letter]

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Dear editor

We appreciate the interest of Cione et al in our study. Obviously, we agree that crystalline lens opacity is a relevant source of error for axial length (AL) measurements. This was briefly mentioned in the introduction as well as in the discussion (in relevance to the agreement of lens thickness measurements between instruments). A more detailed discussion of the refractive index (RI) in the human lens according to the grade of cataract could have been included, as could the ratio of corneal thickness to AL. The study by de Bernardo et al is very interesting and shows that a linear regression formula based on postoperative AL measurements could improve accuracy of AL measurements based on group refractive index (GRI).[1] Comparing this method with measurements based on segmental RI would be interesting. However, the formula was developed using a PCI biometer which does not measure lens thickness (LT) or postoperative ACD. We believe such correction would need to be developed for the same type of biometer it should be used with, for instance, OLCR or OCT biometers, which include LT and postoperative ACD measurements.

Cione et al state concern about the reported mean arithmetic refractive prediction error (RPE) for the Lenstar being different from zero. The bias of the RPE with the Lenstar (0.17 D) indicated that these constants, despite previous optimization for the Lenstar, were not optimal for the study sample. Therefore, we also analyzed results after reducing the arithmetic mean error (for each IOL type, surgeon and biometer) to zero, as suggested Wang et al.[2] The point of such adjustments is to mimic optimal lens constants so that the results are based on the spread of the data, not lens constants that are less than perfect. Also, when using these methods there is no reason to exclude toric IOLs in a study of (spherical equivalent) refractive prediction.

Cione et al are also concerned that we did not report the number of eyes analyzed for each IOL because an optimization process should include at least three cases. In the study, all combinations of IOL models and surgeons had 13 or more eyes except for one which was based on four eyes. We would like to point out that we did not do an optimization of lens constants for future use. We merely adjusted the mean by subtracting the mean error for each IOL type, surgeon and biometer. Therefore, we believe that the number of eyes was not necessary information.

The authors of the letter also question if it is correct to optimize formulas for each biometer in a study that aims to analyze differences between these devices.

First, we believe that analyzing results with optimized constants reflects a clinical setting, in which optimized constants would be used to improve refractive precision. Most of the studies we compared also used optimized constants. Second, in this study, the optimization (or the zeroing of the mean error) was not based on axial length. Third, as pointed out above, even if the mean is zero the mean or median or absolute error will reflect the spread of the data. This is described in several papers.[2–4] The differences of the measurements between the devices were clearly demonstrated in the "agreement of biometry" section of the article.

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In our study, results of normality checks were not explicitly reported. However, it was clearly stated in the methods that analyses were performed using parametric or non-parametric tests as appropriate. So, for instance, when we used the Friedman test this indicated non-normality of the data.

We agree with Cione et al that the statistical test used for comparing percentages (Cochrane's Q test) should have been reported. We also agree that the small samples in the short and long eyes groups are not sufficient to make conclusions. As suggested, analyzing quartiles according to axial length is an alternative approach that could have been used in addition. However, given the small differences in the normal AL-group, it appears unlikely that this would give clinically significant differences.

Disclosure

The authors report no conflicts of interest in this communication.

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