

## Peer Review File

Article information: <http://dx.doi.org/10.21037/atm-20-6628>

### Reviewer comments

The paper titled “A four-year observation of corneal densitometry after Implantable Collamer Lens V4c implantation” is interesting, ICL V4c implantation demonstrated safety and efficacy for myopia correction. The CD value increased at 4 years postoperatively and correlated with age, preoperative SE, UDVA, and IOP. However, there are several minor issues that if addressed would significantly improve the manuscript.

Comment 1: This study should increase the comparison with other postoperative results of intraocular lens implantation, which may be more meaningful.

Reply: We thank the reviewer for this important question. We added the comparison between ICL V4 and V4c in the introduction section according to your comments.

Changes in the text: line 68-71: Hyun et al(10) reported ICL and ICL V4c are both safe and effective in correcting myopia and myopic astigmatism. Furthermore, there was no difference in the postoperative visual outcome between ICL and ICL V4c.

Comment 2: How to analyze the objective vision quality and vision-related quality of life early after ICL V4c implantation? What inspection methods can be used?

Reply: We thank the reviewer for this important question. We use OQAS to evaluate the objective vision quality and a Quality of Life Impact of Refractive Correction (QIRC) questionnaire to analyze the vision-related quality of life after refractive surgery. We will use these two methods to assess the patients after ICL V4c implantation in the future study.

Comment 3: Compared with the ICL V4, what is the stability of the central hole type ICL V4c implantation for the correction of medium and high myopia and the effect of high-order aberration analysis?

Reply: We thank the reviewer for this important question. Except the advantages we mentioned in the introduction section as ICL V4c simplified the surgery procedure. We added the comparison between ICL V4 and V4c in the introduction section. Tian et al reported that although the high-order aberrations and spherical aberrations were higher in ICL V4c implantation than in ICL V4 implantation ( $P < .05$ ). The presence of the central hole of Visian ICL V4c has no significant effect on visual quality.

Changes in the text: Line 68-69: Hyun et al(10) reported ICL and ICL V4c are both safe and effective in correcting myopia and myopic astigmatism.

Tian Y, Jiang HB, Jiang J et al Comparison of Implantable Collamer Lens Visian ICL V4 and ICL V4c for high myopia: A cohort study. *Medicine (Baltimore)*. 2017;96:e7294.

Comment 4: This study lacks studies of different age groups and diopters. And the subjects should be followed up for a longer period of time.

Reply: We thank the reviewer for this important question. ICL V4c implantation was approved and introduced in China in 2014 Dec. We are the first unit to conduct this operation in China. These patients in the present study were included early who undergo ICL V4c surgery. We will include more patients and divide them into different age groups and diopters for a longer period of time in future study.

Comment 5: Compared with femtosecond laser microlens resection, what is the visual quality after implantable contact lens for high myopia? Where are the advantages and disadvantages?

Reply: We thank the reviewer for this important question. According to the research

reported by our group, ICL V4c caused lower HOAs induction than SMILE. Despite the postoperative visual disturbances, both ICL and SMILE provided good efficacy, safety, predictability and high satisfaction in correcting high myopia. ICL V4c maintains the integrity and biomechanical characteristics of the cornea, and reduces the risk of corneal ectasia and corneal haze while SMILE avoids the risk of intraocular complications such as corneal endothelial damage or intraocular pressure elevation.

Wei R, Li M, Zhang H et al. Comparison of objective and subjective visual quality early after implantable collamer lens V4c (ICL V4c) and small incision lenticule extraction (SMILE) for high myopia correction. *Acta Ophthalmol* 2020 May 18.

Comment 6: The number of patient samples in this study is too small, and a large sample study should be added for verification.

Reply: We thank the reviewer for this important question. The patients included in this study is the first group patients underwent ICL V4c implantation in China, and some patients did not visit as demanded. We will add more patient in the future investigation.

Comment 7: There are many uncertainties in retrospective research, which increase the deviation of research results. How to explain and solve this problem?

Reply: We thank the reviewer for this important question. There are information bias and selection bias in retrospective study. In this study, all the results were measured by instruments rather than by questionnaires, and the diagnosis results were strictly based on the objective

results rather than the subjective judgment of the researchers. The instruments were calibrated in a unified standard. Therefore, there were no non-response bias, recall bias and diagnostic suspicion bias in information bias and diagnostic bias. Selection bias includes admission rate bias, Neyman's bias, and detection signal bias. In this study, strict and standardized inclusion and exclusion criteria were adopted to reduce the impact of selection bias. However, as a retrospective cross-sectional study with a single

center, which is the top one eye hospitals in China, and the conditions of patients are often good, there is a medical opportunity bias. Therefore, we will conduct prospective cohort or RCT study in future research.

Comment 8: The latest developments and development trends of implantable ophthalmoscopes should be included in the discussion, so as to enrich the information of this paper.

Reply: We thank the reviewer for this important question. ICL V4c shows good result not only in high myopia and myopic astigmatism but also demonstrated efficiency in moderate even low myopia patients. The ICL models with a central port (V4c, EVO, EVO +) is becoming more popular.

Changes in the text: Line 320-331: As the ICL models with a central port (V4c, EVO, EVO +) is becoming more popular, the long-term safety and effectiveness are always of concern.