Causes of Explantation of Phakic Intraocular Lenses

We read with interest the article by Alió et al. on phakic intraocular lens (PIOL) explantation in the January issue. There is an ongoing debate about the long-term safety of PIOLs, especially angle-supported lenses. In late 2014, Alcon Laboratories, Inc. discontinued production of the AcrySof CACHET Phakic Lens (Alcon Laboratories, Inc., Fort Worth, TX), the ophthalmic industry’s latest attempt of many with this approach (all of them unsuccessful). The numbers are impressive in this clinical series, by far the largest published, and only comparable to those reported in 2006 by Alió et al.

Our first question is why the authors did not perform endothelial keratoplasty instead of penetrating keratoplasty, when the case required bilensectomy followed by corneal transplantation.

When analyzing the explantations due to cataract, knowing the age of this subgroup of patients would have helped to make a better analysis of the influence of surgical trauma and presence of PIOL versus senile cataract.

It is not really correct to state that the reasons for endothelial cell loss are related to inadequate anatomy of the anterior chamber, as the authors did. Regardless of their anatomy, if those eyes had not undergone the lens implantation, none of them would have presented endothelial damage. There were cases of corneal decompensation in all three groups of PIOLs (angle-supported, iris-fixated, and posterior chamber). Although information on incidence is lacking, because three to seven times more cases of corneal decompensation presented in the angle-supported group (15 eyes versus 5 eyes in the iris-fixated group and 2 eyes in the posterior chamber group), it appears that this anatomical site has an increased risk of severely altering the corneal endothelium. The same trend was evident in the eyes with endothelial cell loss without corneal decompensation (11 to 23 times more cases in the angle-supported group). It would have been helpful to have the data available on the density of the population of endothelial cells in these eyes, because the clinical implications of having approximately 1,500 cells/mm² are not the same as having approximately 600 cells/mm².

Although it is probable, at least for earlier models of posterior chamber PIOLs, and is in concordance with other studies cited by the authors, because they did not establish incidence it is not possible to affirm that the incidence of cataract formation was significantly higher with those lenses, as they did. The authors emphasized that the aim of the study was not the evaluation of the explantation ratio and recognized that this was a limitation of their study. We believe it would have been useful to have those data to put the findings in context. Having such a large group of patients, we strongly believe that calculating incidence of explantation (at least for one of the participating centers) or estimating an approximate incidence measure if the exact number of lenses of each model implanted in each is definitely not known will provide valuable information to the scientific community.

REFERENCES

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Reply:

We appreciate the comments of Galvis et al. concerning our article on the causes of phakic intraocular lens (PIOL) explantation with different PIOL models. PIOL explantation is becoming a hot topic today because patients who had a PIOL implanted some time ago have become older and some of the pitfalls in the designs and the limitations in the study of the diagnostic anatomy that were available when they were implanted (sometimes 20 years ago) are becoming evident over time, as we have reported in a previous study. In this report, we demonstrated that the anatomy of the anterior chamber in patients with a phakic IOL changes with aging due to the well-known growth of the crystalline lens and the consequent displacement to an anterior position of the iridozonular lens diaphragm. Therefore, anterior chambers become shallower over time. We predicted that this would happen between 15 and 20 years after PIOL implantation in most of the cases. Shallower anterior chambers (Figure 1) result in damage to the corneal endothelium when minor trauma such as eye rubbing happens to the implanted eye causing a significant negative impact, particularly in eyes with anterior chamber PIOL models.

Bearing this in mind, the endothelium is indeed the main problem. As noted by Galvis et al., endothelial keratoplasty could be the technique of choice when the IOL is explanted to avoid corneal decompensation. This was not the case in our study, because such cases are considered by us to be more complicated and prone to complications so we did not include them as an initial indication for such endothelial grafting technique.

Our study targets the causes of explantation of PIOLs rather than the epidemiology of the complications related to the number of lenses implanted. Because we conducted our investigation in referral centers, a significant number of the cases of this report were referred by other surgeons. This made it impossible for us to ascertain the frequency of the implantations performed by the referring physician. Even in our institution some of the patients who had PIOL implantation at a young age are no longer available for follow-up because today’s mobile society means young people frequently move away. This is why approaching an epidemiological study in which the incidence of the complications is related to the number of implants was impossible in our series without creating an important scientific epidemiological bias.

PIOLs are well known today, despite their related problems, as an adequate refractive surgical technique for the correction of high refractive errors. The anatomical limits and landmarks of the anterior chamber for their correct indication are much clearer today thanks to the diagnostic imaging techniques that recently have become available, such as high frequency ultrasound and, in particular, anterior segment optical coherence tomography. We are certain that in the future better designs, better biomaterials, and better indications are going to limit the problems in PIOLs, which are a remarkable tool for the correction of high myopia, hyperopia, and astigmatism.

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