Response to comment on: Cataract surgery in eyes with associated coloboma: Predictors of outcome and safety of different surgical techniques

Dear Editor,

We thank Shrivastava et al. for providing us insightful feedback on our manuscript. The authors in their letter to the editor have brought up some very relevant points concerning techniques of intraocular lens (IOL) power calculation and IOL implantation, which have often been in the doldrums of contention and dissension due to difficulties and challenges of biometry in coloboma eyes with microcornea.

IOL implantation remains essential for the completeness of cataract surgery. However, in eyes with coexisting retinocortical coloboma, one must consider if the implantation of the IOL would actually be optically beneficial for the patient or would it just be a redundant implant. Especially, for eyes with extensive posterior pole/optic nerve involving colobomas, there is no sensory retina to intercept the refracting rays.

As the primary aim of our retrospective study was to analyze the outcomes of cataract surgery in eyes with associated retinocortical coloboma, the study was designed to accommodate variables that could help us understand the risks and benefits of different surgical techniques on the anatomical and functional outcomes. However, in this letter of response, we have attempted to clarify the queries raised by Shrivastava et al. pertaining to biometry and IOL implantation technique. A reply to the queries raised has been detailed below.

In our article, we have refrained from giving insight into the challenges of IOL implantation and individual modifications for facilitating implantation, considering the lack of definitive data to defend our retrospective intraoperative observations. Although our study involved multiple surgeons, the indications for IOL implantation and the technique were constant across the population. IOL implantation was considered in eyes with corneal diameter ≥ 8 mm in the presence of good capsular support. On the forefront, there were two major challenges when attempting IOL implantation; these included IOL insertion and IOL dialing. The introduction of a single-piece IOL across an inadequately sized sclerocorneal wound may create impingement of the optic margin on the inner lip of the sclerocorneal tunnel. Since a single-piece acrylic lens has a maximum optic diameter of 6 mm, an 8 mm inner lip is sufficient to allow a margin clearance of 1 mm on either side. A relaxed and large-enough inner lip facilitates struggle-free implantation and decreases the risk of iatrogenic trauma to the Descemet’s membrane by the optic margin. A cornea with a diameter of 8 mm has an estimated circumference of 27 mm (2πr), hence an 8 mm incision is approximately one third of the circumference. However, as the corneal diameter decreases to 6 mm and less, the inner lip needs to be almost more than 50% of the corneal circumference to allow implantation of a 6-mm IOL. For this reason, implantation was preferred in eyes having a corneal diameter of 8 mm or more in our series. The presence of existing zonular weakness in the area of coloboma makes “in the bag” placement and IOL rotation fraught with the risk of zonular dialysis. Capsular tension rings were used to support the quadrant of zonular instability.

We were able to implant the IOL without any haptic trimming or haptic-related modifications in the majority of our cases, indicating that the capsular bag/ciliary sulcus was adequate to incorporate a 12-mm acrylic implant. Studies evaluating the correlation between the white-to-white diameter and lens diameter have found both variables to be independent of each other. It has been our observation that lens dimension...
The IOL itself may seldom be the reason for anterior segment crowding in eyes with relative anterior microphthalmos since the known axial thickness of the cataractous lens (range 3.78 ± 0.21 mm to 5.03 ± 0.46 mm) is greater than that of the implanted IOL (<2 mm). We could implant the commercially available 12-mm acrylic IOL without any haptic modification since the coloboma and microcornea were not associated with microphthalmos. The mean AL in Type 1 microcornea was 23.7 ± 2.21 mm (range 20–29.7 mm), whereas it was 24.1 ± 2.20 mm (range 18.94–31.0 mm) in Type 2 microcornea.

In eyes presenting with coloboma and microcornea, the IOL power calculation is more of estimation rather than an approximation. The existing reports on cataract surgery in eyes with coloboma have not detailed much into the aspect of biometry and its associated challenges. As there is no recommended formula in particular for colobomatous eyes, we used SRK-T for all eyes, as it caters to a wide range of ALs.

The common challenges hampering accurate prediction of IOL power include (a) the inability to perform optic biometry in the presence of advanced-grade nuclear sclerosis and poor fixation due to nystagmus; (b) erroneously incorporating the colobomatous area during measurement of AL measurements on contact A-scan often leading to overestimation of AL; (c) small cornea, which makes keratometry tedious and unrewarding; (d) inability to accurately predict the estimated lens position; and (e) inability to accurately localize the limbus in the presence of spherocorneas, making white-to-white measurements difficult. The keratometry values in our series ranged from 37.5 to 50 D for K1 and 39 to 54 D for K2. Because only a small proportion of eyes had flatter keratometric readings, the mean K readings did not change much because of the large sample population.

We agree that comparing the potential factors across the ALs could have provided a homogenous sample population to start with. On the downside, stratification of the risk factors based on AL would not have given a true risk prediction, because the surgical challenge in eyes with coloboma is heightened in the presence of microcornea and shallow anterior chamber depth. Pragmatically, it is the anterior chamber depth that affects the intraoperative course more than the posterior segment length of the eye. The procedural choice and the ability to perform it safely depend on the corneal diameter and available anterior chamber depth for manipulation.

To summarize, no two eyes with coloboma are the same. Versatility while choosing the surgical approach safeguards against potential procedural complications. When choosing an IOL formula, SRK-T can be used, considering its applicability over a wide range of ALs. However, commenting on its equivalence or superiority in relation to other regression or theoretical formulas is outside the scope of our study. IOL modifications might not always be necessary as the posterior segment is not stunted in the same proportion and implantation of commercially available IOL can be considered. Haptic trimming and customized IOL should be reserved for eyes with evident stunting of the posterior segment intraoperatively.

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Conflicts of interest
There are no conflicts of interest.

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