

A brief note on bilateral aqueous misdirection after routine cataract surgery in angle closure.

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Description

The 'Effectiveness of Early lens Extraction for the treatment of Primary Angle-Closure Glaucoma' (EAGLE) study reported its findings in 2016 and recommended Clear Lens Extraction (CLE) over Laser Peripheral Iridotomy (LPI) in angle closure disease [1]. Worldwide, anterior segment surgeons have been giving it due consideration, even if it may not have been readily adopted universally. However, when cataract is present in such eyes, then most surgeons do not seem to have reservations about performing lens surgery alone even though cataract surgery in angle closure eyes comes with a slight increased risk of aqueous misdirection [2]. Furthermore, several authors have stated that its occurrence in one eye, increases the risk of a similar episode post-surgery in the fellow eye [2,3].

In the study, Aqueous Misdirection (AM) was reported in both the eyes of a patient which had undergone routine cataract surgery with in-the bag IOL [4]. Pre-operatively, both the eyes were noted to be shallow with normal Intra Ocular Pressure (IOP) and disc and therefore the surgeon had no hesitation in planning cataract surgery alone via phacoemulsification in each. The left eye presented with high IOP on two topical Anti Glaucoma Medications (AGM) 1 week after surgery and in the right eye, which was operated 2 months prior to the left, IOP was borderline. It is at this stage that gonioscopy was done for the first time and revealed occludable angles with moderately difficult indentation. In the absence of a Laser Peripheral Iridotomy (LPI), this was attempted initially and as the AC did not deepen appreciably, a laser hyaloidectomy was also performed. This led to deepening of the AC in the right eye but not in the left; gonioscopically, the angle opened in the right eye but had 4-quadrant synechia in the left. The latter eye, with unresolved AM, eventually needed trabeculectomy with ostial-Irido-Zonulo-Hyaloido-Vitreotomy (o-IZHV) [5,6]. This procedure utilises the sclerostomy and iridectomy created as part of the filtration surgery to access the zonules for zonulectomy which in turn creates a passage into the anterior vitreous for anterior vitrectomy and hyaloidectomy and eventual primary posterior capsulectomy [6]. This process allows creation of an unhindered communication between the anterior and posterior segments, rendering the eye unicameral, an essential feature for the resolution of AM. It is only after o-IZHV that the left eye settled down.

Unlike the evidence in the EAGLE study [1], cataract surgery alone failed to resolve angle closure in both eyes of this patient. The former reported a very low rate of AM, both in the CLE arm as well as the LPI arm of the study. However, it is noteworthy, that there is missing pre-operative data with respect to synechial closure in approximately 59% of the eyes (i.e. indentation gonioscopy was either not performed or was

not reported) and approximately 5% eyes had missing data with respect to gonioscopy altogether. Furthermore, median Axial Length (AL) in the EAGLE study was 22.5 mm and Anterior Chamber Depth (ACD) was 2.5 mm. Eyes with short axial length and shallow AC are known risk factors for AM. However, in particular, there is a report which suggests that eyes with shorter AL (<21.5 mm) and shallower ACD (<2.2 mm) along with greater quadrantic synechial angle closure are risk factors for development of intra-operative AM, when compared to angle closure control eyes that did not develop AM [5]. Varma et al. [2] in a fairly large series of eyes reporting AM after cataract surgery, also found that the mean AL was short (21.3 mm) and mean ACD was 2.3 mm and the majority of the eyes (75%) were known to be shallow or had angle closure glaucoma and had received a LPI prior to cataract surgery [2].

Therefore, it may be possible that most of the eyes recruited in the EAGLE study were at low risk for the development of AM anyway and that the relatively longer AL and ACD is the most likely explanation for the low incidence of AM in the study. On the other hand, it remains unclear whether LPI per se would have prevented the occurrence of bilateral AM in the patient being discussed, as it did not prevent it in 15 eyes of the series reported by Varma et al. [2] Nonetheless, the risks of cataract surgery in short and shallow eyes with synechial closure should be discussed with the patients at the pre-operative counselling session, such that they are well aware of it should it be encountered. This will ensure all round preparedness for this sight threatening complication, which may occur intra or post-operatively, and which has the potential to jeopardise the outcomes of cataract surgery in such eyes. Furthermore, surgeons should be well equipped to deal with it, should it occur intra-operatively or post-operatively via a myriad of approaches that have been described before [5-7].

Conclusion

To conclude, the low rate of AM in the EAGLE study may lull ophthalmologists into a false sense of security when contemplating CLE or cataract extraction alone in angle closure eyes. To minimise its occurrence, not only is gonioscopy mandatory pre-operatively in all such eyes, but a careful inspection of the biometric parameters prior to cataract surgery is essential. Only then can one give due consideration to pre-operative laser peripheral iridotomy in all those eyes that are smaller, shallower and have greater quadrantic synechial closure.

Conflict of Interest

Author Vanita Pathak Ray declares that she is consultant to Santen, Allergan and Novartis but has no conflict of interest.

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