Safety and efficacy of intracameral mydriatics: Lignocaine and epinephrine in manual small-incision cataract surgery and their effect on blood pressure and heart rate

Dear Editor,

Intracameral mydriatics are a newer, faster option for intraoperative mydriasis. Poor bioavailability of topical mydriatics leads to a delay in the onset of mydriasis due to their low corneal permeability. Repeated eye drop instillations are likely to cause transient ocular surface toxicity. Cardiovascular side effects occur due to systemic absorption via the nasal mucosa and conjunctival vessels.

In this prospective, cross-sectional interventional study, we aimed to study the efficacy of 1% lignocaine + 0.1% epinephrine intracameral injection in induction and maintenance of mydriasis in manual small-incision cataracts surgery (MSICS) and their effects on blood pressure and heart rate and noted their postoperative complications.

After approval by the institutional ethical committee, a total of 60 patients of both sexes with age-related cataracts, posted for MSICS were included in the study after obtaining informed consent.

Inclusion criteria were patients with age >50 years, with age-related cataract whose pupillary dilatation >6 mm with topical mydriatics during preoperative evaluation.

Exclusion criteria were patients with pupillary disorders, intraocular pathologies that affect the outcome of surgery, h/o use of alpha-blockers/nonsteroidal anti-inflammatory drugs/prostaglandins/miotics, h/o previous intraocular surgery in the same eye, and blood pressure >140/90 mmHg during preoperative evaluation with or without ischemic heart diseases.

All surgeries were performed by a single experienced surgeon using the standard procedure of MSICS. On the day of surgery, topical mydriatic was not instilled in the operating eye and was undilated. The preoperative undilated pupillary diameter was measured under a slit lamp. Intraoperative pupil diameter (P) was measured with Castroviejo surgical calipers under fixed microscope illumination and magnification at different stages of surgery as explained in Table 1. Blood pressure (BP) and pulse rate (PR) were recorded at four stages using a digital sphygmomanometer as explained in Table 2.

We followed the standard operative procedure for MSICS with peribulbar anesthesia, except that, following side-port entry, 0.2 mL of a mixture of 2 mL preservative-free lignocaine hydrochloride 1% + 1 mL intracameral adrenaline 1:1000 was injected into AC through the side port to achieve mydriasis. After 30 s, the standard MSICS steps were continued till closure.

If the mydriasis was inadequate intraoperatively, the surgeon decided either to reinject intracameral mydriatic solution or to apply other methods of pupil dilation whenever required.

On the first postoperative day, patients were examined for visual acuity (using Snellen’s visual acuity chart), corneal edema (using Oxford Cataract Treatment and Evaluation Team [OCTET] grading) and anterior chamber (AC) inflammation (using Standardized Uveitis Nomenclature). The sample of 60 patients recruited for the study had 33 males (55%) and 27 females (45%). The mean age of the study sample was 66 ± 4 years.

An increase of 0.7 ± 0.283 mm from baseline pupillary diameter of 3.7 ± 0.962 mm was noted following peribulbar block and the peak value of 7.35 ± 1.205 mm was attained following intracameral injection of a mydriactic solution, which gradually reduced to 6.03 ± 1.327 mm after cortical wash and 5.7 ± 1.212 mm after IOL implantation to reach 5.53 ± 1.171 mm by the end of the surgery [Table 1].

This dilation was sufficient to make an adequate-sized capsulorrhexis and nucleus delivery into the AC. Reduction in mydriasis with the nucleus delivery and cortical wash might be due to the phacosandwich technique, which leads to manipulations of the iris. Similar dilation is seen in MSICS with intracameral mydriatics study by Ajay et al.[3]

About 89.4% of cases achieved adequate mydriasis (>6 mm). The remaining 11.6% cases failed to achieve adequate mydriasis and needed mydriatic solution reinjection. The pupillary fatigue caused due to repeated dilation of the pupil with topical
mydriatics on the previous day for preoperative evaluation might be one of the causes for poor dilation in a few of our cases.

Intracameral injection of the mydriatic solution did not cause any significant spike in systolic blood pressure (SBP) and diastolic blood pressure (DBP) throughout the surgery. Our results are comparable with the study by El Hadad et al.[3] However, a significant transient rise of 10 mmHg was noted in the systolic blood pressure following peribulbar block but returned to baseline values within few minutes [Table 2]. Similar results are seen in the study by Yu et al., wherein the rise in SBP following peribulbar block is attributed to surgically induced neurogenic hypertension.[4]

We noted that the pulse rate remained statistically close to the baseline value of 77.27 ± 1.04 bpm and did not vary significantly after intracameral mydriatic injection and was maintained throughout the surgery. Our results are comparable with the study by Saraiya et al., who also reported no variation of pulse rate after intracameral epinephrine.[5]

On postoperative day 1, the results of corneal edema, anterior chamber (AC) inflammation, visual acuity were within normal limits, and comparable with results of other MSICS studies with topical mydriatics.

We conclude that intracameral mydriatics lignocaine 1% and epinephrine 0.1% are safe and effective alternatives to achieve adequate and sustained pupillary dilation for MSICS. They do not alter blood pressure and heart rate. However, additional methods of pupil dilation need to be kept on standby in the small percentage (<10%) of patients who do not achieve adequate mydriasis.

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**Conflicts of interest**
There are no conflicts of interest.

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