Intraocular pressure during general anaesthesia with classic LMA as compared to facemask: A randomized study

Primary Author: Dr. Vanlalnghka Darlong

Co-Authors: Dalim Baidya, MD; Ravindra Kumar Pandey, MD; Renu Sinha, MD; Tanuj Dada, MD;

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IOP is routinely measured under anaesthesia in children suffering from glaucoma. However, anaesthesia with the use of an airway device can change IOP and thereby influence management and subsequent outcome. Use of endotracheal tube or a laryngeal mask airway (LMA) has been shown to cause rise in IOP. On the other hand, increasing depth of anaesthesia is known to cause a decrease in IOP. Therefore, we planned this study to measure IOP under various depth of anaesthesia with the use of LMA as compared to facemask as the airway device. Depth of anaesthesia was measured with BIS.

Material and methods; After obtaining clearance from the institutional ethics committee, 86 American Society of Anaesthesiology (ASA) physical status I and II children, aged between 0 to 12 years were enrolled in our study after exercising the inclusion and exclusion criteria’s. A computer generated randomization scheme was used to categorize these children into 2 equal groups and they were allocated to either of the study group by sealed envelope method as follows: 1) Group M: Receiving GA with facemask 2) Group L: Receiving GA with LMA.

All the children were shifted to operating room accompanied by either of the parent. Anaesthesia was induced with inhalation of sevoflurane in oxygen (O2). At the loss of eyelash reflex, a sensor strip for measuring BIS value. Proparacaine local anaesthetic eye drops were instilled in both the eyes to provide intraoperative analgesia and IOP were measured with the use of applanation tonometry (Perkins) by an ophthalmologist who is blinded to the study and anaesthetic technique. IOP were measured when the BIS value was between 40 and 60. In Group M, anesthesia was maintained with O2/N2O (50:50) at a flow rate of 4 L/min and sevoflurane with facemask to maintain BIS value between 40 and 60 with spontaneous ventilation. During recovery when sevoflurane and N20 were stopped, at BIS ranging between 60 and 80 the IOP was measured again. In Group L, of appropriate size were inserted when BIS value is less than 60 and proper position of LMA were confirmed by bag movement and EtCO2 monitoring and IOP measured immediately after LMA insertion, and then similarly during recovery at BIS 60 â€“ 80.

Results: 86 children posted for a scheduled examination under anaesthesia (EUA) including intraocular pressure who fulfilled the inclusion criteria were included in the study. There is no significant different in demography (Table-1). We found the IOP was significantly low in both the LMA group and Face-mask group when measured at a deeper plane of anaesthesia (BIS 40-60) in
comparison to IOP measured at a lighter plane of anaesthesia (BIS 60 -80). In the LMA group the IOP was 14.13+4.90mmHg with BIS of 40 -60 and 15.52+4.57 mmHg with a BIS of 60 -80 (P value 0.001) 95 % CI 1.26-0.26. In the Facemask group IOP was13.41+ 4.04 mmHg with a BIS of 40 -60 and 14.18 +3.64mmHg with a BIS of 60 -80 ( P value 0.003) ) with 95 % CI of 1.26-0.2 (Table-2). Though the IOP was increased after insertion of LMA from 13.63+4.83 mmHg to 14.02+5.03mmHg, it was not statistically significant (p.value 0.11and 95% CI 0.09-0.88). 

Discussion; We believe the decrease in IOP at a deeper plane of anaesthesia in comparision to a lighter plane of anaesthesia because of the inhalational agents as they are known to cause a decrease in both IOP and Blood pressure. Studies by Sator-Katzenschlager S, et al. in adult patient also showed a decrease in IOP after induction of anaesthesia. Studies Dominguez A, et al also showed a decrease in IOP when Sevoflurane was used as inhalational agents to provide general anaesthesia (1, 2).

The use of LMA does not seems to have a significant effect on IOP. A similar study by Agrawal et al found a significanct rise in IOP after insertion of Proseal LMA (3). The difference in finding between the two studies may be because they used Proseal LMA which is bulkier and more challenging to insert in their study compared to classic LMA which we used in our studies.

Conclusion: There is a significant decrease in IOP when measured at a deeper plane of anaesthesia compared to measurement at a lighter plane. However, the insertion of Classic LMA does not seems to have any significant change in IOP.

References: