Effect of Entropy Guided Low Flow Desflurane Anaesthesia on Laryngeal Mask Airway Removal Time in Children Undergoing Elective Ophthalmic Surgery - A Prospective, Randomized, Comparative Study

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INTRODUCTION

- In children, entropy & Bi spectral index (BIS) guided titration of inhalational anaesthetic agent like isoflurane & sevoflurane leads to faster recovery after anaesthesia.
- However, role of entropy & low flow anaesthesia in recovery following desflurane anaesthesia is not known in children.
- We assessed effect of entropy on Laryngeal Mask Airway (LMA) removal in children undergoing ophthalmic surgery using low flow desflurane anaesthesia.
- We also evaluated effect of entropy on consumption of desflurane in children.

METHODOLOGY

- After ethics committee approval, parental consent & assent, 80 ASA grade I-II children, aged 2-14 years, undergoing elective ophthalmic surgery were randomized into entropy guided (group E) and minimum alveolar concentration (MAC) guided group (group M).
- After induction of general anaesthesia & muscle relaxation, LMA was inserted and anaesthesia was maintained using oxygen, air(FiO₂ 0.5) & desflurane using low fresh gas flow (0.8L/min).
- In Entropy group, desflurane was titrated to maintain state entropy (SE) value of 40-60.
- In MAC group, desflurane was titrated to maintain a MAC value between 1-1.3.
- Intraoperatively, Paracetamol 15mg/kg was administered for analgesia and Ondansetron 100µg/kg for PONV prophylaxis.
- We compared LMA removal time (time from switching off desflurane at the end of surgery till removal of LMA), hemodynamic parameters, uptake & consumption of desflurane between both the groups.
- Hemodynamic parameters, ventilator parameters, entropy and MAC values were compared between both the groups intraoperatively & postoperatively.
- We also compared PONV, emergence delirium, pain in postoperative period and interventions used for them i.e. metoclopramide, midazolam and fentanyl respectively.

RESULTS

- The groups were comparable with reference to age, weight, sex, indication of surgery & duration of procedure.
- There was significant decrease in LMA removal time in group E (4.34±2.03 minutes) compared to group M (8.8±2.33 minutes) (p<0.0001).
- Consumption of desflurane was also significantly less in group E (25.3±8.11 ml) compared to group M (18.7±5.07) (p<0.0001).
- Intraoperatively, entropy values were significantly lower in group M, whereas MAC values and end tidal desflurane were found to be significantly lower in group E.
- No difference was seen in PONV, emergence delirium, post-operative pain and other interventions in both the groups.

REFERENCES:

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Groups	LMA removal time (minutes)					p value
	Minimum	Maximum	Mean ± SD	95% Confidence interval (CI)	Median	
Group M, n=40	5.1	14.1	8.80 ± 2.33	(3.49,5.43)	9.15	<0.0001
Group E, n=40	1.9	12.7	4.34 ± 2.03		3.75	

Variable	Group M, n=40, Mean ± SD	Group E, n=40, Mean ± SD	p value
Uptake of Desflurane, ml	5.9 ± 2.25	4.6 ± 2.28	0.019
Consumption of Desflurane, ml	25.3 ± 8.11	18.7 ± 5.07	<0.0001

DISCUSSION

- We obtained a 50% reduction in LMA removal time with a difference of 4.46 minutes when desflurane was titrated using entropy values compared to MAC values.
- Talawar P et al & Choi et al^(1,2) also found reduction in awakening time with the entropy use for isoflurane (2min) & sevoflurane (3min) titration respectively. However they did not consider the reduction in time to be clinically significant.
- In a high volume centre, a difference of 4.46 minutes when extrapolated to the number of cases done in a day in OT will result in clinically relevant difference.
- The reason of this difference may be the use of desflurane, low flow anaesthesia and no use of premedication.
- Wu et al⁽³⁾ found a reduction in consumption of sevoflurane when titrated using entropy.

CONCLUSION

- Entropy guided low flow anaesthesia is associated with faster awakening and reduced consumption of desflurane in children 2-14 years of age.