



“COMPARISON OF PROPOFOL ALONE VERSUS ETOMIDATE AND PROPOFOL COMBINATION ON CHANGES IN HEMODYNAMIC VARIABLES FOLLOWING CLASSIC LMA INSERTION IN ELECTIVE SURGERIES: A RANDOMIZED DOUBLE BLINDED INTERVENTIONAL STUDY

Anaesthesiology

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ABSTRACT

Introduction: LMA is a simple supra-laryngeal device which is used to establish and maintain airway. Despite the common use of the LMA, there are no optimal methods of anesthesia that can guarantee a proper insertion. The purpose of this study is comparing two methods of induction of anesthesia (Propofol, Propofol+Etomidate) in the hemodynamic stability after LMA insertion in elective surgeries.

Methods: A total of 84 patients with ASA classes I and II undergoing elective surgeries were randomly allocated into one of the following two groups. Anesthesia induction methods included: Group A (propofol 2.5 mg/kg) and Group B (propofol 1 mg/kg plus etomidate 0.2 mg/kg). HR, SBP, DBP and MAP were measured before induction and after induction. Number of attempts to laryngeal mask insertion, ease of placement, were compared in two groups. **Results:** There is significant difference in hemodynamic changes between group A in comparison with group B. HR was significantly lower in group A than group B. There was significant difference in the number of attempts and ease of LMA insertion between group A in comparison with group B. **Conclusion:** Etomidate plus propofol is an effective and alternative to propofol for facilitating LMA insertion with the added advantage of lack of cardio-vascular depression.

KEYWORDS

INTRODUCTION

Laryngeal Mask Airway (LMA) is a simple supraglottic device which is placed without requiring direct laryngoscopy. It is an appropriate device for maintaining airway in both elective and emergency surgeries either in adults or in children. Several methods have been introduced for LMA insertion while no standard anesthesia induction method has been proposed to guarantee a proper placement of the device.

The most frequent anesthetic used for LMA placement is propofol which is widely used in out-patient surgeries due to its associated low postoperative nausea and vomiting rate.

Propofol is associated with desired jaw relaxation and prohibits reflexes such as coughing or bucking following LMA insertion. On the other hand, it is of some unwanted complications such as hypotension, bradycardia and prolonged apnea. With an elimination half-life of 4-7 hours, propofol is distributed rapidly in the circulation and enter central nervous system. Some of the complications of the propofol include pain on injection site and cardiovascular depression.

Etomidate is one of the IV anesthetics which are used alone or in combination with other anesthetics for anesthesia induction; it also has been used for anesthesia maintenance in different contexts.

It is mostly used in the cardiac patients because of its cardiovascular stability. Etomidate is of a rapid onset and emergence from anesthesia and it is not associated with histamine release. It has sedative and hypnotic characteristics with no analgesic effects.

The main objective of this study was to compare the efficacy of two different anesthesia induction approaches [Propofol (P), Etomidate + Propofol (E+P)] in maintaining cardiovascular stability following LMA insertion in elective surgeries.

MATERIALS AND METHODOLOGY

STUDY LOCATION: The present study will be conducted at operation theatres in Sawai Man Singh Medical College and Attached group of hospitals.

STUDY DESIGN: Hospital-based double blind randomized interventional study.

STUDY PERIOD: After approval from Ethics committee till completion of study.

SAMPLE SIZE: The sample size calculated is 42 cases in each group at 95% confidence and 80% power to verify the expected difference of

11(±14.19) mm/hg in variation in SBP after LMA insertion in both group. This sample size is adequate to cover all other study variables too (as per seed article).¹⁵

STUDY GROUPS: Patients will be randomly allocated into 2 groups. (42 patients in each group)

GROUP A (n=42): Patients will receive Inj. Propofol 2.5 mg/kg IV

GROUP B (n=42): Patients will receive Inj. Etomidate 0.2 mg/kg + Inj. Propofol 1.0 mg/kg IV

DOUBLE BLINDING: This trial is so planned that neither the investigator nor the patient will be aware of the group and the drug used. Both drugs are milky white in colour. The anesthesiologist who would prepare and administer drugs would be different from anesthesiologist who would observe study variables.

RANDOMIZATION: 84 eligible cases will be allocated in to two study groups by sealed envelope method

PROCEDURE

On arrival in the operation theatre, fasting status, written informed consent and PAC will be checked. Routine non-invasive monitors will be attached and baseline parameters i.e. heart rate (HR), Systolic blood pressure (SBP), Diastolic blood pressure (DBP), Mean arterial pressure (MAP) will be noted. ECG will be attached to the patient. A 18 G intravenous (IV) canula will be secured and ringer lactate infusion will be started. Inj. midazolam 0.025 mg/kg IV and Inj. fentanyl 2 µg/kg IV will be given 5 minutes before induction. For induction group I will receive Inj. Propofol 2.5 mg/kg IV and group II will receive Inj. Etomidate 0.2 mg/kg + Inj. Propofol 1 mg/kg IV. All study drugs will be prepared by an anesthesiologist who was blinded to the details of the study. Volume of medication and speed of injection (10 seconds) will be equal in all two groups after induction of anesthesia, hemodynamic variables will be recorded. Later 60 seconds after loss of consciousness, which will be confirmed by inability to respond to verbal commands and loss of eyelash and LMA insertion will be done. Bilateral air entry will be checked & LMA tube will be fixed. Hemodynamic value (SBP, DBP, MAP & HR) will be measured 1, 2, 3, 5 & 10 min after LMA Insertion. Then surgery will be commenced & anaesthesia will be maintained with 60% Nitrous Oxide and 40% Oxygen, 1% sevoflurane. At the end of the surgery LMA Extubation will be done. Patient will be shifted to recovery room. In recovery room patient will be observed for any side effects.

Results

Demographic characteristics of the patients in two groups have been

presented in . No significant difference could be observed regarding demographic characteristics of the patients in two groups. Hemodynamic changes (SBP,DMP, MAP and HR) at different stages of anesthesia in all groups have been presented in .

DISCUSSION

The current study has been conducted on the hemodynamic stability in elective surgeries. In our study, decrease in systolic blood pressure, diastolic blood pressure, and mean arterial pressure were significantly more frequent in group A compared with other groups. Hemodynamic stability was more visible in group B. Etomidate is a hypnotic of choice in most cardiac diseases and also an excellent option to be used in combination with other anesthetics. Uzuner et al., in a study on 50 patients, compared etomidate and remifentanyl with propofol in LMA insertion. They reported decrease in MAP in 25 patients having received propofol 2.5 mg/kg and remifentanyl 0.05 mg/kg in comparison with the patients having received etomidate 0.3 mg/kg and remifentanyl 0.05 mg/kg. They later concluded that etomidate would provide a better hemodynamic stability.

Propofol with the dose of 2.5 mg/kg is accompanied by appropriate relaxation and avoidance of complications such as coughing and bucking following LMA insertion. This, however, could be associated with undesirable decreased blood pressure, bradycardia, and prolonged apnea. Combination of etomidate with propofol would not only decrease the required dose of both medications but also provide us with the benefits of both agents including more stable hemodynamic, enough muscle relaxation required for LMA insertion and better airway quality. Etomidate administration could lead to agitation and postoperative nausea and vomiting which could be eliminated by adding propofol. In our study in heart rate there is no difference could be observed comparing groups A and B. MAP was more stable in group B compared with group A highlighting the hemodynamic stability in these groups following decreasing the required propofol dose and addition of etomidate as an adjuvant. In a study, the effect of A and B were studied on 84 patients concluding that most hemodynamic variables were more stable in B and MAP was decreased more significantly in group A compared with other groups.¹⁶ The findings of this study are in line with ours; the most frequent decrease in blood pressure occurs in the group A while group B is associated with the least changes in blood pressure. However, the combination ratio of 1:1 was used in their study; unlike our study in which the combinations were used on dose-basis.

The major finding of the present study is that group B provides a more stable hemodynamic in comparison with A. Hemodynamic stability is considered a prominent characteristic of a proper anesthetic; propofol reduces blood pressure and heart rate but B provides a desirable stable hemodynamic.

Table 1. Demographic characteristics of the patients in two groups

	Group A	Group B
Sex		
Male	2	2
Female	40	40
ASA		
Male	2	2
Female	40	40
Age	40 ± 16	40.4 ± 16.5
Weight	50 ± 13	50 ± 12.3

Table 2. Hemodynamic changes (SBP, DMP, MAP and HR) at different stages of anesthesia in all groups

	Groups	Before anesthesia	After anesthesia	Before LMA	After LMA
SBP	A	120	103	101	100
	B	128	116	109	110
DBP	A	78	66	65	62
	B	81	75	69	68
MAP	A	89	76	74	72
	B	92	83	77	77
HR	A	81	76	73	72
	B	83	82	72	74

Data are presented as Mean ± SD.

CONCLUSION

Quality of the maintained airway and LMA insertion was different in both groups. A is superior to B regarding the number of the attempts

and insertion ease and considering the fact that group A provides appropriate condition for LMA insertion.

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