

COMPARISON OF PROPOFOL VERSUS PROPOFOL WITH LOW DOSE SCOLINE TO EVALUATE LMA INSERTION

Shilpin Solanki¹, Nayna Solanki²

¹M.D Anaesthesiology, Ex. Assistant Professor in Anaesthesia U. N. M Hospital, Civil, Ahmedabad

²M. D. Anaesthesiology, Assistant Professor in Anaesthesia GCS Medical College, Naroda, Ahmedabad.

Corresponding Author:

Email: drshilpinsolanki@gmail.com / drnaynasolanki@gmail.com

ABSTRACT:

Background: LMA insertion requires sufficient depth of anesthesia and depression of airway reflexes. Propofol is the agent of choice for LMA insertion as it is very effective in suppressing cough and gag reflexes. On the other hand addition of low dose scoline improves correct position of the laryngeal mask. Our main aim of study was to compare the hemodynamic changes, time taken for LMA insertion and ease of LMA insertion using Propofol v/s propofol with low dose scoline in both groups.

Method: The study was conducted in sixty ASA-1 and ASA-2 grade patients. All patients were investigated preoperatively for routine investigations. Written informed consent was taken. After applying monitors all patients were premedicated with Inj. Ondansetron (4 mg), Inj. Glycopyrrolate (0.2 mg), injection midazolam 0.03 mg/kg IV two minutes before three minutes of preoxygenation. Gr P received Inj propofol 2.5 mg/kg/iv and Gr (P+S) received Inj propofol 2.5 mg/kg/iv with Inj Scoline 0.2 mg/kg/iv. Overall Grading of Insertion score, Rescue Drug Usage Grade, LMA Insertion time were noted. Patients were observed for any complication postoperatively.

Result: Jaw opening was comparable but statistically insignificant in both groups. No vigorous movements were noted in (P+S) group while 6.67% patients in P group had vigorous movements. This was statistically significant ($p < 0.05$). Overall grading of insertion score was statistically significant ($p < 0.05$) between two groups. Overall satisfactory conditions for LMA Insertion were possible to increase from 73.33% to 93.33% by rescue drug usage propofol in Gr P.

Conclusion: We concluded that to yield better LMA Insertion low dose scoline 0.2 mg/kg/IV in addition to propofol and midazolam is required.

Keywords: LMA insertion, Propofol, low dose scoline.

INTRODUCTION

With going more and more experience about defaults in older methods and devices, new techniques and devices are being introduced with sole aim of making anesthesia "A safe practice".

The Laryngeal Mask Airway (LMA) is an innovative device made for upper airway management. It was originally designed by British Anesthesiologist Dr. Archie I. j. Brain. It is widely used to provide spontaneous as well as controlled ventilation in patients. Since it does not cross the glottis opening, the hazards of laryngoscopy especially sudden elevation of blood pressure and pulse rate are avoided to patients under particular circumstances. LMA Insertion is associated with minimal pressure response, minimal increase in intraocular pressure and intracranial pressure compared to endotracheal tube. LMA provides adequate control to allow intermittent positive pressure ventilation. It is well tolerated at the time of recovery and provides clear airway in postoperative period.

As LMA Insertion requires a sufficient depth of anesthesia and depression of airway reflexes, Propofol is the agent of choice LMA Insertion. A premedication with midazolam reduces the dose requirement of propofol, improves conditions for LMA Insertion by slight muscle

relaxation and amnesia. Scoline suppresses laryngeal reflexes by depolarization of motor neuron end plate. Low dose scoline improves the correct positioning of the laryngeal mask, decreases the incidence of swallowing, gagging, and head or limb movement, simultaneously minimizing the usual side effect seen with its normal dosage.

So the present study was launched to compare the efficacy of propofol alone versus propofol with low dose scoline to evaluate LMA Insertion.

METHODOLOGY

The study was conducted in sixty patients posted for elective short surgical procedure. Institutional ethical committee approval and written informed consent was taken from all patients. They all belonged to ASA-1 and ASA-2 grade aged between 18 to 55 yrs and were of either sex. Exclusion criteria for patient selection are patient with history of Upper respiratory infections, K/C/O Bronchial asthma, obesity, H/O drug allergy, patient with anticipated difficult airway, patient with increase risk of regurgitation. All patients were told about the study. Written informed consent was taken. On arrival in pre-operative room, monitors were attached and baseline heart rate and systolic, diastolic and mean arterial blood pressure, spo₂ were recorded.

After pre anesthetic evaluation patients were randomly allocated in two groups of 50 patients. All patients were premedicated with Inj. Ondansetron (4 mg), Inj. Glycopyrrolate (0.2 mg), injection midazolam 0.03 mg/kg IV two minutes before three minutes of preoxygenation. Gr p received Inj propofol 2.5 mg/kg/i.v and Gr (P+S) received Inj propofol 2.5 mg/kg/IV with Inj Scoline 0.2 mg/kg/IV. Induction agents given over 30 secs. If induction is not adequate 1/10th dose of induction agents were repeated in increments till loss of eyelash reflex. Ventilation assisted in both groups. LMA Inserted with standard technique in both groups.

Anesthesia was maintained with O₂ + N₂O (33% +67%) + volatile agents +Non depolarizing muscle relaxants. Ventilation through LMA was done by giving tidal volume of 6-8 ml/kg and attaining maximum airway pressure between 15-20 cm.H₂O to prevent gastric insufflations and oropharyngeal leak. Overall Grading of Insertion score, Rescue Drug Usage Grade, LMA Insertion studied variables were noted on three point scale in both groups according to point grading was done for both groups. Hemodynamic variables noted in form of heart rate, systolic BP, diastolic BP and spo₂.

LMA Insertion studied variables

variables	3	2	1
jaw opening	full	partial	nil
Ease of insertion	easy	difficult	impossible
coughing and gagging	nil	mild	vigorous
Laryngospasm	nil	partial	total
pt s movements	nil	moderate	vigorous

LMA Insertion time- noted from IV inj of midazolam to successful insertion of LMA in both groups. Patients were observed for any complication (sore throat, Awareness, Myalgia) postoperatively.

STATISTICAL ANALYSIS:

The data was analyzed using analysis of variance for repeated measures, with paired student's t-test at each instance. The results were quoted as Mean±SD. The probability value p<0.10 was considered as not significant. p<0.05 was considered as significant. Value. p<0.01 was considered as very significant. p<0.001 was considered as very highly significant. We had used trial version 15.0.

RESULTS

Table no 1: Demographic data (Mean±SD)

	P	P+S	P value
Age (yrs)	28.03± 9.17	29.04± 9.56	<0.10
Weight (kg)	55.1± 4.98	56.60± 5.06	<0.10
Sex (M:F)	19:11	23:7	-

The two groups were comparable in terms of age and weight with no statistical significance. (P<0.10)

Hemodynamic variables: With p value of p<0.10, the preinduction vitals including heart rate, systolic BP, diastolic BP and spo₂ were comparable in both groups. After giving inj. Midazolam there is slight decrease in heart rate in both the groups but of no significance (P<0.10). During LMA Insertion heart rate increased temporarily but not above basal level and it gradually settled down. There was no bradycardia or any arrhythmias noted in (P+S) group. Both systolic and diastolic pressure increased at LMA Insertion and slightly decreased after induction. It gradually settled down till 3 minutes after LMA Insertion. There was no any fall of spo₂ during LMA Insertion or after induction.

Table no. 2: LMA insertion - Studied variables

Variables	Grade	Description	P group	P + S group	P Value
Jaw Opening	3	Full	24 (80%)	28 (93.3%)	
	2	Partial	6 (20%)	2 (6.67%)	<0.10
	1	Nil	0	0	
Ease of insertion	3	Easy	25 (83.33%)	28(93.33%)	
	2	Difficult	5 (16.67%)	2 (6.67%)	<0.10
	1	Impossible	0	0	
Coughing and Gouging	3	Nil	30 (100%)	30 (100%)	
	2	Mild	0	0	<0.10
	1	vigorous	0	0	
Laryngospasm	3	Nil	30(100%)	30(100%)	<0.10
	2	partial	0	0	

	1		total		
	3		nil	20(66.67%)	28(86.67%)
Pts movements	2		Moderate	8(26.67%)	4(13.33%)
	1		Vigorous	2 (6.67%)	0

Above table shows Jaw opening was comparable but statistically insignificant in both groups. There was no incidence of coughing, gagging and laryngospasm in any group. However the comparison for ease of LMA insertion in both groups was statistically insignificant. Considering patient movements, there were no patient movements during LMA insertion in 66.67%, moderate movement in 26.67% patients and vigorous movements in 6.67% patients in P group. While in (P+S) group 86.67% patients reported no movement, 13.33% patients had moderate movements. None of the patient in (P+S) group had vigorous movements. This was statistically significant. (P<0.05)

Table 3: Overall grading of insertion score

Grade	Score	Ground P n=30	Group P+S n=30	P value
1-Excellent	15	15 (50%)	26 (86.67%)	<0.05
2- Satisfactory	13-14	7 (23.33%)	3 (10%)	<0.05
3- Poor	<13	8 (26.67%)	1 (3.33%)	<0.05

Comparing overall grading of insertion score, it was grade 1 in 50% patients, grade 2 in 23.33% patients and grade 3 in 26.67% patients in P group. While in (P+S) group 86.67% patients had grade 1, 10% patients had grade 2 and 3.33% patients had grade 3 obtained. It was statistically significant. (P<0.05)

Table no 4: No of patients required rescue drugs for LMA insertion

Parameters		Ground P n=30	Group P+S n=30	P value
Successful	LMA Insertion	15 (50%)	22 (73.33%)	<0.05
Rescue	Mild- grade 1	7 (23.33%)	7 (23.33%)	<0.10
Drug	Moderate- grade 2	6 (20%)	1 (3.33%)	<0.05
Usage grade	Severe - grade 3	2 (6.67%)	0	<0.10

Thus in P group through overall percentage of excellent and satisfactory grade was (50+23.33=73.33%), it was possible to increase in up to (73.33+20=93.33%) of Successful LMA Insertion with rescue drug usage propofol and only 2 (6.67%) patients were shifted to low dose scoline in (P+S) group.

Time taken for Successful LMA Insertion from IV inj of midazolam was 6.12±0.34 mins in P Group while it was 6.10±0.13 mins in P+S Group. The comparison was statistically insignificant. (P<0.10). In P group, none of the patients had any postoperative observed complications. In P+S group, 90% of the patients had no myalgias, 26.66% patients had mild myalgias which require no treatment and, 13.34% patients had moderate myalgias which require simple analgesics for treatment. Overall 40% patients in P+S group reported myalgias. It was statistically significant. (P<0.05)

DISCUSSION

The Laryngeal Mask Airway (LMA) is an innovative device made for upper airway management. It was originally designed by British Anesthesiologist Dr. Archie I. j. Brain. Since it does not cross the glottis opening, the hazards of laryngoscopy especially sudden elevation of blood pressure and pulse rate are avoided to patients with compromised cardiovascular and cerebrovascular

status and it also provides spontaneous as well as controlled ventilation in patients.

LMA Insertion requires a sufficient depth of anesthesia and depression of airway reflexes, Propofol is the agent of choice for LMA Insertion as it is very effective in suppressing cough and gag reflexes. However when used alone in unpremedicated patients, it can lead to gross patient movements and failure to insert LMA. If higher than 2.5 mg/kg dose is used for LMA Insertion, it may lead to untoward sequel like hypotension and apnoea.

So the present study was launched to compare the efficacy of propofol alone versus propofol with low dose scoline to evaluate LMA Insertion.

PREMEDICATION

We used injection midazolam 0.03 mg/Kg as a premedication before induction. It was given two minutes before three minutes of preoxygenation.

A study done in 1996 used midazolam as a premedication and compared propofol versus thiopentone to facilitate LMA Insertion. They showed pretreatment with midazolam reduced dose requirement of propofol and better suppression of airway reflexes^{1, 2}. Various studies had favored propofol with midazolam over thiopentone with midazolam for LMA Insertion with use of midazolam as a premedication³. Nakazawak et al compared fentanyl 1microgramme/kg with midazolam

0.05mg/kg as a premedication using propofol as a induction agent for LMA Insertion. They found smaller incidence of severe head and limb movements on LMA Insertion in midazolam group. In addition, propofol- midazolam combination was more cost effective as compared to propofol-fentanyl^{4, 10}.

ANAESTHETIC INDUCTION

Various induction agents have been tried up till now for LMA Insertion. Few to mention are propofol, Thiopentone, sevoflurane etc. propofol is recommended as an induction agent for LMA Insertion because it depresses upper airway reflexes better than thiopentone. Various muscle relaxants have been used for induction to insert LMA^{5, 6}. Rapid onset and short acting neuromuscular blocking drugs such as scoline suppress laryngeal reflexes by depolarization of motor neuron end plate.

Abdul Monem et al compared low dose scoline 0.35mg/kg with low dose atracurium 0.06 mg/kg to evaluate LMA insertion during thiopentone induction. They noted no failure in LMA insertion with scoline group as compared to atracurium group⁷. In other studies, they had described no failure in LMA insertion with use of low dose scoline following propofol 2.5mg/kg and the LMA was inserted with first attempt⁸. Similar results were obtained as in our study like improved positioning of the LMA, decreased incidence of limb movements. However mild myalgia was common side effect of scoline used which comparable with our study.

Hemodynamic variables: Preinduction vitals including heart rate, systolic BP, diastolic BP and spo₂ were comparable in both groups. In our study after giving inj. Midazolam there is slight decrease in heart rate in both the groups but of no significance (P<0.10). Similar results were found after giving induction agents in both the groups. There was slight decrease in blood pressure compared to patient's basal blood pressure with the use of propofol as induction agent in our study but it gradually settled down till 3 minutes after LMA Insertion. These findings are consistent with other studies².

LMA insertion- STUDIED VARIABLES:

In 2004 studies were done to assess conditions for LMA Insertion and noted no incidence of jaw opening, coughing, gagging and laryngospasm just like in our study^{2, 7}.

In our study none of the patient in (P+S) while, 6.67% patients in P group had vigorous movements which was statistically significant. (P<0.05). Hashimote et al found excellent insertion conditions for LMA insertion in 90% of patients with a scoline dose of 0.5 mg/kg as compared to 45% in 0.2 mg/kg.

Overall grading of insertion score:

A study done for LMA Insertion with use of minidose scoline 0.1mg/kg following IV induction with Propofol 2.5 mg/kg and reported that minidose scoline improved the correct positioning of the LMA during the first attempt, decreased the incidence of swallowing gagging and head or limb movements.⁸ Their results were comparable with result of our study.

USE OF RESCUE DRUG: Thus, In group P through overall percentage of excellent and satisfactory grade was (50+23.33=73.33%), it was possible to increase in up to (73.33+20=93.33%) of Successful LMA Insertion with rescue drug usage propofol and only 2 of 30 (6.67%) patients were shifted to low dose scoline (P+S) group. Vandana Talwar et al. reported 8% patients who required additional bolus of Propofol for Successful LMA Insertion². While none of the patients in the low dose scoline group required rescue drug for LMA Insertion during thiopentone induction in another study⁷.

TIME TAKEN FOR LMA INSERTION: In our study Time taken for Successful LMA Insertion was same in both groups. Similar result was found in a study, which use Propofol 2.5 mg/kg with inj midazolam 0.04 mg/kg and fentanyl 1.5µg /kg for LMA Insertion².

Myalgias are common side effects of scoline even when using low dose scoline 0.2mg/kg. The results of our study are comparable with other studies who observed myalgias with an 0.25mg/kg dose of scoline^{9, 7}. Other complications like sore throat, awareness were not observed in any of the group in our study.

CONCLUSION

We concluded from this study of comparison of propofol alone versus propofol with low dose scoline to evaluate LMA Insertion as follows:

- No significant changes in hemodynamic parameters were there when using propofol and propofol with low dose scoline for induction.
- Severity of patient's movements was more when using propofol alone compared to propofol with low dose scoline. However, overall satisfactory conditions for successful LMA Insertion can be significantly increased by rescue drug usage (propofol).
- Time taken for successful LMA Insertion was similar in both the groups.
- Postoperative were noted inspite of using low dose scoline 0.2 mg/kg/IV but it was relieved by simple analgesics.

Thus, LMA Insertion can be done satisfactorily using propofol 2.5 mg/kg with midazolam 0.03 mg/kg as a premedication. However when

needed, low dose scoline 0.2 mg/kg can be combined to yield better LMA Insertion condition with its inherent mild side effects.

CONFLICTS OF INTEREST: None

AUTHORS' CONTRIBUTION: First author had given Substantial contributions to the conception the work, analysis of data for the work, drafting the work, ethics committee approval, study design, data collection, data analysis, and interpretation of data; statistical analysis, writing of the report; the decision to submit the report for publication. Second author was available through the research study. All written work done by second author.

ACKNOWLEDGMENTS

The authors are indebted to Associate Professor Dr P. Khare for his kind cooperation in the conduct of this study.

REFERENCE:

1. Pramod Bopat, RN Joshi, Young E, Jago RH. Comparison of propofol versus thiopentone with midazolam or lidocaine to facilitate LMA insertion. *Can J Anaesth* 1996; 43 (6): 564-68.
2. Vandana Talwar, Rajesh PATTANAYAK, Sujesh Bansal. Comparison of propofol versus thiopentone for facilitation of LMA insertion. *J Anaes Clini. Pharmacology* 2004, 20(1):33-38.
3. Nishiyama T., Hanaoka K. Anesthesia induction for laryngeal mask insertion- Comparison among sevoflurane, isoflurane, and propofol. *Anesth Analg* 1998; 47(11):1320-4.
4. Nakazawa K, Hikawa Y, Maeda M, Tanaka N, Ishikawa S, Makita K, Amaha K., Laryngeal mask airway insertion using propofol without muscle relaxants: A comparative study of pretreatment with midazolam or fentanyl, *Eur J Anesthesia.* 1999; 16(8):550-5.
5. Scanlon P. Carey M, Power M, Kirby F. Patient response to laryngeal mask airway insertion after induction of anesthesia with propofol and thiopentone. *Can J Anaesth* 1993; 40: 816-18.
6. Vinik HR, Bradely EL Jr., Kissin L. Triple anesthetic combination: propofol-midazolam-alfentanyl. *Anesth Analg* 1994; 78(2):354-58.
7. Abdul Monem, Ursula Chohan, Comparison of low dose succinylcholine with low dose Attracurium to evaluate LMA insertion during thiopentone induction. *J Anaes Clini. Pharmacology* 2004, 20(1):39-44.
8. HO KM, Chui PT. The use of mini-dose suxamithonium to facilitate the insertion of laryngeal mask insertion. *Comment in Anesthesia.* 1999; 54(7):686.
9. Y. Hashimote, J. Hirashima, T Hakoda R, Yamada M. Uchiyama. Low dose succinylcholine facilitates LMA insertion during thiopentone anesthesia, *Br. J. Anaesth.* 1999; 83(2):299-83.
10. T. Goyagi, M Tanaka and T.Nishikawa. Fentanyl decreases propofol requirement for laryngeal mask insertion. *Acta Anaesthesiol Scand.* 2003 Jul; 47(6):771-4.