

Original Research Article

Comparative evaluation of topical and intravenous lignocaine for insertion of laryngeal mask airway with propofol

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ABSTRACT

Background: Objective of present study to determine that administration of Intravenous Lignocaine prior to propofol is as effective as topically on the posterior oropharynx for LMA insertion.

Methods: 60 patients of age group 16-45years of both sexes, ASA Grade I and II undergoing elective surgeries. Group 1: (n=30) Patients receiving Lignocaine 1.5 mg/kg IV over 30 seconds. Group 2: (n=30) Patients receiving lignocaine aerosol 40 mg topically. Conditions of LMA insertion, gagging laryngospasm, coughing noted at time of insertion, ECG, NIBP, SPO2 and ETCO2 were recorded according to scheduled times.

Results: In Conditions of insertion, difference between groups reached significance, $p < 0.05$. In groups at first min, rise in heart rate, fall in DSP, SBP and MAP was significant. At two and three minutes post LMA insertion these parameters change slightly but statistically not significant.

Conclusions: Topical Lignocaine 10% aerosol prior to propofol induction provides excellent conditions for LMA insertion without the use of neuromuscular blockages.

Keywords: LMA Laryngeal mask airway, Topical lignocaine aerosol

INTRODUCTION

Laryngeal mask airway is possibly the most significant recent advance in airway management. Devised to be passed into the hypopharynx without a laryngoscope, it is a relatively new non-invasive ventilatory device which has allowed a radical change in the management of modern general anaesthesia. Insertion of LMA avoids direct laryngoscopy, instrumentation of larynx and vocal cord visualisation. Thus the placement of an LMA is less stimulating and leads to less pressor response than direct laryngoscopy.¹ Studies were conducted to find the various techniques to attenuate the pressor response to laryngoscopy, endotracheal intubation, bronchoscopy, bronchography and extubation. Insertion of LMA requires the airway reflexes to be obtunded by general/topical anaesthesia or muscle relaxants. Intact

airway reflexes may cause gagging, coughing or laryngospasm. If general anaesthesia is used, LMA insertion requires a depth almost similar or more to that necessary for insertion of an oropharyngeal airway but not as deep as is needed for tracheal intubation.² In day-care surgery, the anaesthetic techniques should be tailored to allow early patient recovery with minimal side effects.

The most popular induction agent for LMA insertion continues to be propofol as this agent best obtunds oropharyngeal reflexes, suppresses cough reflex and decreases the sensitivity of upper airway. For LMA insertion, use of only propofol as sole induction agent has less success rate. So many co-induction agents had been tried to get better success rate. Much research has therefore been conducted using a variety of

supplementary drugs to find a compound which eases LMA insertion e.g. midazolam, lignocaine, fentanyl and succinylcholine.³⁻⁵

In previous studies conditions for LMA insertion when thiopentone is preceded by topical lignocaine spray match those seen with propofol. Lignocaine given IV may improve the LMA insertion conditions when propofol is used.

The purpose of this study is to determine that administration of Intravenous Lignocaine prior to propofol is as effective as when applied topically on the posterior oropharynx for LMA insertion.

METHODS

This was a randomized prospective study. Hospital ethical committee approval was taken and study was carried out on 60 un-premedicated patients of age group 16-45years of both sexes, ASA Grade 1 and 2 undergoing elective surgeries.

Patients with a history of coronary artery disease, hypertension, endocrinal disorder, metabolic disease, respiratory disease, allergic history or anticipated difficult airway were excluded from the study. Patients were randomly allocated into two groups:

- Group I: (n=30) Patients receiving Lignocaine 1.5 mg/kg IV over 30 seconds (30 seconds prior to injection Propofol).
- Group II: (n=30) Patients receiving lignocaine aerosol 40 mg topically (4 sprays of lignocaine 10% spray, 10mg/ spray, were used 3 minutes prior to injection propofol at interval 30 sec each).

In all patients detailed preanaesthetic check up was done with routine investigations for urine, haemoglobin%, TLC, blood urea, blood sugar and serum electrolytes. Baseline chest X-ray and ECG was done. Written and well informed consent was taken.

Table 1: Conditions for LMA insertion.

Conditions of LMA insertion	Gagging	Laryngospasm	Coughing
Excellent	Grade 0/1	None	None
Good	Grade 0/2	None	None
Poor	Grade 2	None	Present
Unacceptable	Grade 3	Present	Present

After shifting the patient to operation theatre, IV line taken, basic monitors were applied, after stabilization for 5 minutes basic parameters were recorded.

In Group I after preoxygenation with 100% oxygen for 3 minutes, IV lignocaine 1.5mg/kg over 30 seconds was

given followed by inj. propofol 2mg/kg. LMA insertion was attempted by using standard technique.

In Group II after preoxygenation with 100% oxygen for 3 minutes lignocaine aerosol was spread to posterior pharyngeal wall, and its either sides (total 4 sprays, 10mg/spray) followed by inj. Propofol 2mg/kg and LMA insertion after 30 seconds of propofol and conditions for LMA insertion and vital parameters were recorded.

Grades of gagging

Grade 0- No Gagging, Grade 1- Gagging settled within 30 secs, Grade 2-a further dose of induction agent required, Grade3 -Suxamethonium was required

ECG, NIBP, SPO2 and ETCO2 were recorded according to scheduled times:

- T0 Base line reading
- T1 Thirty seconds after induction with propofol
- Post LMA insertion
- T2 One minute
- T3 Two minutes
- T4 Three minutes

Patient’s lungs were not manually ventilated and they did not receive volatile agents or nitrous oxide before the first set of readings was taken post LMA insertion.

During recording of second and third minute patients were started on nitrous oxide (66% in O2) and vecuronium in dose of 0.1mg/kg after proper LMA confirmation.

Further anaesthesia was maintained with standard protocol for general anaesthesia as per surgery. Continuous monitoring of ECG, HR, BP, SPO2, ETCO2 were done at every 5 minute intervals.

Statistical analysis was performed using paired t-test and categorical data analysed using chi-square test. A p-value of <0.05 was accepted as statistically significant.

RESULTS

Both groups were comparable and no statistical difference was found among these groups with respect to age, sex, ASA status and type of surgeries.

Table 2: Age and sex distribution.

	Sex distribution		Age distribution	
	Male	Female	10-25	05
Group A	21	09	26-35	17
			35-45	08
			10-25	04
Group B	22	08	26-35	07
			35-45	19
			10-25	04

Table 3: Types of surgeries performed.

Type of surgery	Number of cases	
	Group I	Group II
Cholecystectomy	2	1
Skin Grafting	8	9
Tension Band Wiring	3	2
Modified Redical Mastectomy	2	2
Herniorrhaphy	3	3
R/U Plating	5	3
Flap Rotation	1	1
Humerus Plating	2	2
Fistulectomy	1	2
Ulnar Plating	1	2
D.H.S.	1	1
Amputation	1	2
Total	30	30

In conditions of insertion, for statistical analysis the poor and unacceptable groups were combined and the difference between groups reached significance, $p < 0.05$ (Table 4).

Table 4: Conditions of LMA insertion in groups.

Condition	Group I	Group II
Excellent	20	25
Good	4	3
Poor	4	1
Unacceptable	2	1

Table 5: Patient responses to LMA insertion.

Airway Characteristics	Group I IV Lignocaine	Group II Topical Lignocaine
Gagging		
Absent	22	27
< 30 Sec.	2	1
Propofol Required	5	2
Suxamethonium Required	1	0
Coughing		
Absent	27	29
Present	3	1
Laryngospasm		
Absent	28	29
Present	2	1
No. of attempt		
One	25	29
Two	4	1
More	1	0

In Group 1, five patients out of 30 required more propofol to suppress gagging and one patient required suxamethonium.

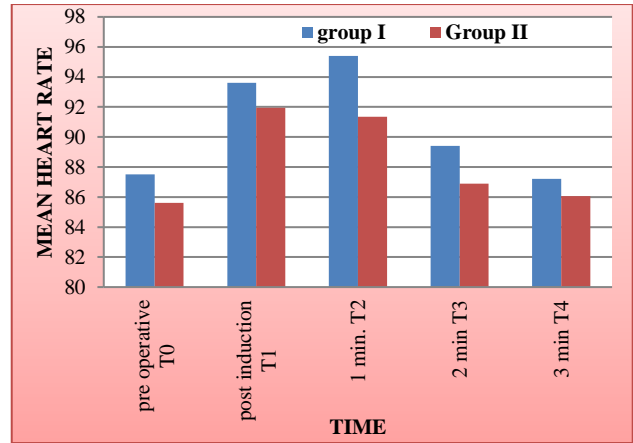


Figure 1: Mean heart rate in two groups at different stages.

Figure 1 shows significant rise in mean heart rate post induction in both groups. At two and three minutes post LMA insertion heart rate remain slightly high from baseline but was not significant.

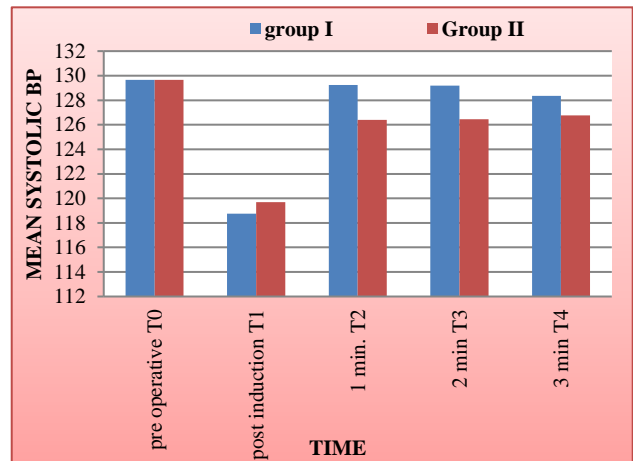


Figure 2: Mean systolic BP In two group.

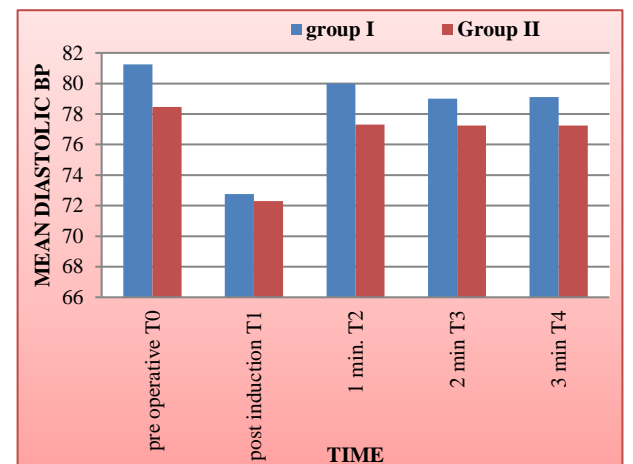


Figure 3: Mean diastolic BP in two Groups.

Post induction significant fall in SBP, DBP, and MAP was seen in both the groups (Figure 2, 3, 4). Changes in Blood Pressure at 2 and 3 minutes were slightly lower but not significant.

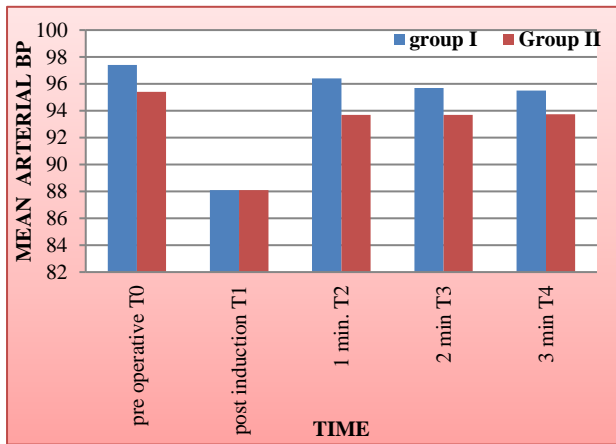


Figure 4: Mean arterial BP In two groups.

DISCUSSION

The LMA insertion requires the suppression of upper airway reflexes to prevent gagging, coughing and laryngospasm. Different intravenous induction agents have been tried for LMA insertion.³⁻⁵ Thiopentone has been assessed for the insertion of an LMA but produces less satisfactory conditions than propofol.^{6,7} Propofol is known to suppress both pharyngeal and laryngeal reflexes more effectively than thiopentone. But studies show an incidence of poor insertion ranging from 38-60% with standard induction doses (2-3mg/kg) of propofol associated with side effects like swallowing, gagging, coughing, limb movement and haemodynamic instability if excess dose of propofol is used.

Lignocaine has been shown to have cough suppressant effect and is dose dependent. Lignocaine also reduces the cardiovascular response to tracheal intubation and LMA insertion when used topically or intravenously.^{8,9} The haemodynamic responses to LMA insertion are much less marked, and their prevention is rarely necessary.¹⁰ Topical lignocaine has a therapeutic effect for 20-40 mins and its local anaesthetic action would have ceased by the time of recovery.¹¹ This study was conducted to compare and evaluate the conditions of LMA insertion and haemodynamic response with topical and IV lignocaine along with propofol induction.

Conditions for LMA insertion

In the study we observed that LMA insertion conditions were better when topical lignocaine was sprayed to the posterior pharyngeal wall (Group II) with less incidence of gagging and coughing. It gave us ability to rapidly and reliably secure patient's airway with LMA resulting in excellent/acceptable conditions for LMA insertion. This result was in accordance to that reported by Cook and

Seavell et al in their study comparing topical and intravenous lignocaine with Thiopentone for LMA insertion.¹² In Group II number of attempts to pass LMA was also significantly less as compared to Group I. This was probably due to suppression of airway reflexes by topical lignocaine applied to the posterior pharyngeal wall. Laryngospasm occurred in 2 patients in Group I.

Comparison of heart rate changes

Baseline heart rate was comparable in both the groups. There was significant rise in mean heart rate ($p < 0.05$) post induction in both groups (T0-T1: 6.1+7.58 of Group I, -6.35 + 5.3 of Group I). This increase was similar in both the groups ($p > 0.05$). Post LMA insertion at 1 min. heart rate increased further (T0-T2: 7.85 = 5.91 of group I, 5.75 = 5.99 of group II), the relative increase in Group II was less but was not significant. At two and three minutes post LMA insertion the heart rate decreased in both the groups and reached to level similar to baseline. LMA insertion causes pressor response, which is reflected as increase in HR, SBP and DBP.

Comparison of systolic blood pressure

Post induction there was a fall in SBP in both the groups which was significant in individual groups ($p < 0.05$) but when compared in between both groups, changes were not significant. Post insertion of LMA the SBP increased but was not significant as compared to baseline in both the groups. At 2 and 3 minute post insertion, SBP changes were not significant. Wilson et al observed that LMA insertion causes transient increase in SBP.¹³ Cook and Seveall et al noted no significant difference in SBP post LMA insertion (IV Lignocaine vs Topical Lignocaine). Our findings were consistent with the finding of Cook and Seveall. The attenuated pressure response was accounted to decrease stimulation by LMA and by use of lignocaine with propofol.

Comparison of diastolic blood pressure

Post induction there was significant decrease in the DBP ($p < 0.05$) in the individual groups (T0-T1: 8.5+5.36 of group I, 6.10+4.80 of group II) which was comparable in both groups. After LMA insertion DBP increased but was non significant compared to baseline. These findings were consistent to previous studies done by various researchers.

Comparison of mean arterial pressure

The MAP decreased after induction to a significant level (T0-T1: 9.34+ in group I, 7.3+3.6 in group II) in both the groups which was comparable ($p > 0.05$). When compared intragroup this was highly significant ($p < 0.001$). There was increase in MAP in both the groups after LMA insertion at one minute but that was not significant ($p > 0.05$) (T0-T2: 1=5.5 in group I, 1.7=8.2 in group II). Similarly at 2 and 3 min. the difference of mean from

baseline was not significant either intragroup or in between two groups ($p>0.05$). These findings were similar to Wood and Forrest and was accounted to attenuated pressure response to LMA and lignocaine.¹⁴

CONCLUSION

In conclusion, present study demonstrates that topical Lignocaine 10% aerosol when sprayed on the posterior pharyngeal wall 3 minutes prior to propofol induction provide excellent conditions for LMA insertion without the use of neuromuscular blockage. No. of attempts required for LMA insertion was significantly less in the topical lignocaine group. Even after LMA insertion changes in HR, SBP, DBP, MAP were insignificant. Hence we conclude that topical lignocaine provides better insertion conditions as compared to IV lignocaine but haemodynamic stability remains same with topical as well as IV lignocaine.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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