

A Study to Assess The Efficacy of Lignocaine (Xylocard) for LMA Insertion and Stress Response in Adults Following Induction with Propofol

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ABSTRACT

Introduction: Laryngeal mask is a new concept in airway management. It is an ingenious supraglottic airway device, which is designed to maintain a seal around laryngeal inlet for spontaneous ventilation and allow controlled ventilation at the modest (<15cm of H₂O) positive pressure. Objective of the study was to assess the efficacy of Lignocaine (Xylocard) for LMA insertion and stress response in adults following induction with Propofol.

Material and Method: The study was carried out in 80 patients of age group of 20-60 years undergoing surgical, gynaecological and orthopedic operations. All patients were belonging to ASA grade II and I.

Results: After LMA insertion there was significant increase in heart rate in-Group B (p value < 0.001) and significant increase in the SABP in-Group B (P value highly significant) but no significant change in DABP. Conditions for LMA insertion were significantly superior in-Group A and there were no adverse airway reflexes during insertion of LMA. In-Group B patients 25% patients had less satisfactory conditions with coughing during LMA insertion. LMA insertion was possible in all patients in first attempt.

Conclusion: Insertion of LMA (laryngeal mask airway) leads to significant stress response and Inj. xylocard (Lignocaine 2%) 1.5mg/Kg body weight 90 seconds prior to induction decreases stress response of LMA insertion. This technique will definitely add to the safety of anaesthetic management of patients who are at increased risk of harmful effects of stress response.

Key words: Lignocaine, stress, propofol

INTRODUCTION

Laryngeal mask is a new concept in airway management. It is an ingenious supraglottic airway device, which is designed to maintain a seal around laryngeal inlet for spontaneous ventilation and allow controlled ventilation at the modest (<15cm of H₂O) positive pressure.¹ LMA also obviates need for intubation in some day care patients.

Endotracheal intubation requires laryngoscopy for visualization of larynx. Endotracheal tube exerts lateral pressure on the tracheal wall, which may provoke undesirable autonomic responses. LMA insertion obviates need for laryngoscopy, but similar and attenuated stress response is seen after LMA

insertion as compared to endotracheal intubation.²

Even this amount of stress can be harmful in some high-risk patients such as patients with history of ischaemic heart disease, hypertension and cerebrovascular diseases.

Smooth insertion of LMA requires attenuation of airway reflexes to avoid sequelae such as coughing, gagging and increase in heart rate and blood pressure. This has been most commonly achieved by using Propofol, which is now easily available. Propofol is undoubtedly a valuable agent for LMA insertion as it allows rapid induction and depresses laryngeal reflexes. But complete safety is not ensured even with Propofol and coughing and gagging is often seen.³

Lignocaine (Xylocard) given intravenously has been successfully used to decrease stress response and airway reflexes to tracheal intubation but its use with LMA is not popular. This study is designed to assess whether Lignocaine (Xylocard) given intravenously can improve conditions for LMA insertion and decrease stress response to LMA insertion.

MATERIAL AND METHODS

The study was carried out in 80 patients of age group of 20-60 years undergoing surgical, gynaecological and orthopedic operations. All patients were belonging to ASA grade II and I.

Exclusion Criteria

Following patients were excluded.

1. Morbidly obese.
2. Patients with high chances of aspiration-
 - a. Patients who were not nil by mouth.
 - b. Patients with increased intraabdominal pressure.
 - c. Pregnant patients with second or third trimester

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How to cite this article: Basavaraj V. Modi, Vaijayanti S. Gandhi. A study to assess the efficacy of lignocaine (xylocard) for LMA insertion and stress response in adults following induction with propofol. International Journal of Contemporary Medical Research 2016;3 (1):237-240.

pregnancy.

3. Patients with reactive airway disease

Preanaesthetic Evaluation

It included a detailed history and physical examination. Investigations included routine blood and urine analysis and chest X ray and electrocardiogram in relevant cases. Written and informed consent was taken from all the patients.

Preoperative preparation included a period of overnight fasting.

Patients were randomly divided in two Groups, A and B.

Group A: Received injection Lignocaine (Xylocard) intravenously before giving injection Propofol.

Group B: Received equal volume of injection placebo (0.9% normal saline).

Technique: On arrival in the anaesthetic room, heart rate, oxygen saturation and non-invasive blood pressure monitoring were instituted.

Premedication: All patients of both Groups were premedicated with Inj Midazolam 0.03mg/kg; Inj. Pentazocine 0.5mg/kg, Inj Ranitidine 1mg/kg and InjMetoclopramide 0.2mg/kg body weight were given intravenously.

Inj. Glycopyrrolate 0.004mg/kg body weight was given intramuscularly 20 minutes before IV premedication. All patients were preoxygenated with 100% oxygen for 5 minutes. 90 seconds prior to induction, Group A received Inj. Lignocaine (Xylocard) 1.5mg/kg body weight intravenously. Group B received equal volume of 0.9% normal saline intravenously. Anaesthesia was induced with InjPropofol 2.5mg/kg body weight intravenously. Appropriate size of LMA was inserted. Cuff of LMA was inflated and LMA was connected to Bain's circuit for controlled ventilation. Patients were paralyzed with InjVecuronium 0.08mg/kg body weight (whenever required).

Anaesthesia was maintained on oxygen and nitrous oxide 50-50%. Intravenous Propofol infusion was given by triple dose regimen, 10mg/kg/hr for 10 minutes, 8mg/kg/hr for next 10 minutes, 6mg/kg/hr, thereafter.

A] Heart rate, blood pressure and oxygen saturation were

measured as follows:

- Before premedication
- Five minutes after premedication,
- After induction
- After LMA insertion
- Five minutes after LMA insertion
- Ten minutes after LMA insertion.

B] Pain of injection of Propofol was assessed postoperatively, with the help of grading scale by asking questionnaire to the patient.

- Grade 0-no pain.
- Grade I- mild discomfort,
- Grade II-significant pain.

C] Ease of insertion of LMA was graded as follows:

- Grade I – Successful insertion without any laryngeal reflexes
- Grade II- Successful insertion with laryngeal reflexes, like
 - Coughing
 - Gagging
 - Laryngospasm
 - Movements of limbs
- Grade III– unsuccessful insertion.

D] Any intraoperative or postoperative complications were noted.

RESULTS

Above Table shows intragroup comparison of changes in the heart rate after various interventions with the baseline value. It shows that, in-Group A there were no significant changes in the heart rate after induction (z value= 0.5), after LMA insertion (Z value = 0.83), and at five (Z value = 0.26) and ten (Z value = 0.16) minutes after LMA insertion.

In Group B, change in the heart rate after induction was not significant (Z= 0.34). After LMA insertion Heart rate increased significantly (P value< 0.001) over the baseline value and this increase was sustained at five (P value= <0.001) and ten minutes (P value< 0.001) after LMA insertion.

Variables	Group A (Z =)	Significance (P Value)	Group B (Z =)	Significance (P Value)
Baseline Vs after induction	0.5	NS	0.34	NS
Baseline Vs after LMA] Insertion	0.83	NS	10	< 0.001
Baseline Vs Five min after LMA insertion	0.26	NS	7.6	< 0.001
Baseline Vs Ten min after LMA insertion	0.16	NS	6	< 0.001
(z>1.96 significant: p<0.001 is significant)				
Table-1: Intragroup comparison of variations in the heart rate				

Variables	Group A (Z =)	Significance (P Value)	Group B (Z =)	Significance (P Value)
Baseline Vs after induction	2.31	0.01 (NS)	3.6	P=0.0002
Baseline Vs after LMA insertion	2.58	0.005 (NS)	6	P< 0.001
Baseline Vs Five min after LMA insertion	2.9	0.002 (NS)	3	P=0.001
Baseline Vs Ten min after LMA insertion	2.1	0.025 (NS)	1	NS
(Z>1.96 significant: p<0.001 is significant)				
Table-2: Intragroup comparison of variations in the systolic arterial blood pressure (sabp)				

Variables	Group A (Z=)	Significance P value	Group B (Z=)	Significance P value
Baseline Vs after induction	0.89	NS	1.9	NS
Baseline Vs after LMA insertion	1.89	NS	0.9	NS
Baseline Vs Five min after LMA insertion	2.16	0.02	0.6	NS
Baseline Vs Ten min after LMA insertion	2.45	0.008	0.4	NS
(Z>1.96 significant: p<0.001 is significant)				
Table-3: Intragroup comparison of variations in diastolic arterial blood pressure (dabp)				

Variables	Group A (Z=)	Significance P value	Group B (Z=)	Significance P value
Baseline Vs after induction	2.2	0.015 NS	2.25	0.014
Baseline Vs after LMA insertion	3	0.001 NS	3.23	0.0006
Baseline Vs Five min after LMA insertion	1	NS	3.4	0.0004
Baseline Vs Ten min after LMA insertion	1.1	NS	3.2	0.0006
(Z>1.96 significant: p<0.001 is significant)				
Table-4: Intragroup comparison of variations in mean arterial pressure				

Table 2 shows that compared to baseline, there was no significant change in the systolic arterial blood pressure in Group A after induction (p value = 0.01), after LMA insertion (P value 0.005), at five minutes (p value = 0.002) and ten minutes (P value = 0.025) after LMA insertion.

In-Group B, there was highly significant increase in the SABP after LMA insertion (Z = 6) and significant increase at five minutes after LMA insertion (P value = 0.001). At ten minutes after LMA insertion SABP had returned to baseline. Table 3 shows intragroup comparison of changes in the DABP. In both the Groups as compared to the baseline changes in the DABP were not significant at any time during the procedure.

In Group A, there was slight but non-significant increase in the MAP after induction (P value = 0.015) and after LMA insertion (P value = 0.001). Change in the MAP at five and ten minutes after LMA insertion was also not significant in Group A.

In Group B, change in the MAP after induction was not significant (P value = 0.014), but after LMA insertion there was significant increase in the MAP (P = 0.0006). Also at five (P value = 0.0004) and ten (P = 0.0006) minutes after LMA insertion increase in the mean arterial pressure was significant.

DISCUSSION

In Group A there were no significant changes in the heart rate after induction (z value= 0.5), after LMA insertion (Z value = 0.83), and at five (Z value = 0.26) and ten (Z value = 0.16) minutes after LMA insertion. In Group B, change in the heart rate after induction was not significant (Z= 0.34). After LMA insertion Heart rate increased significantly (P value< 0.001) over the baseline value and this increase was sustained at five (P value= <0.001) and ten minutes (P value< 0.001) after LMA insertion.

N. Braud and E.A.F. Clements (1989) studied pressor response to the LMA insertion. They demonstrated significant increase in the heart rate after LMA insertion (P value < 0.001) and this increase in heart rate was sustained at one

and three minutes after LMA insertion. The pattern of stress response obtained was comparable with the pattern stress response.²

I.G. Wilson, D. Fell, S.L. Robinson and G. Smith (1992) demonstrated the pattern of stress response to LMA insertion in their study, where they compared the stress response of LMA insertion to that of the endotracheal intubation. They noticed increase in the heart rate by 25% above the baseline after LMA insertion and heart rate started decreasing after ten minutes in LMA Group while it remained elevated in ETT Groups.⁴

M.D Stoneham, Bree and Sneyd (1995) demonstrated the effect of intravenous Lignocaine (Xylocard) on the stress response to LMA insertion. They reported a small but statistically insignificant change haemodynamics after LMA insertion in both study and control Groups.³

In Group B, there was highly significant increase in the SABP after LMA insertion (Z = 6) and significant increase at five minutes after LMA insertion (P value = 0.001). At ten minutes after LMA insertion SABP had returned to baseline. N. Braud and E.A.F. Clements (1989) studied LMA demonstrated significant increase in the SABP after LMA insertion (P value < 0.001), which attained significance at one minute after LMA insertion. (8.6% mean rise) and this increase in heart rate was sustained at three minutes after LMA insertion.²

The pattern of stress response obtained was comparable with the pattern stress response obtained in Group B patients in present study.

I.G. Wilson, D. Fell, S.L. Robinson and G. Smith (1992) demonstrated that though there is increase in the SABP after LMA insertion it does not reach the significance levels and it returned to baseline in short time after LMA insertion.⁴

M.D Stoneham, Bree and Sneyd (1995) demonstrated the effect of intravenous Lignocaine (Xylocard) on the stress response to LMA insertion. They reported a small but statistically insignificant increase in SABP after LMA insertion in both study and control Groups.³

In both the Groups as compared to the baseline changes in

the DABP were not significant at any time during the procedure.

N. Braud and E.A.F. Clements (1989) studied LMA demonstrated significant increase in the DABP after LMA insertion (P value < 0.001) The maximum mean rise in DABP was 11.8% and this increase in DABP was 14.2 % less than the ETT Group. This increase was sustained at three minutes after LMA insertion.²

I.G. Wilson, D. Fell, S.L. Robinson and G. Smith (1992) noticed that insertion of LMA produced no significant increase diastolic arterial pressure. The result was comparable with the present study.⁴

M.D Stoneham, Bree and Sneyd (1995) reported a small but statistically insignificant increase in DABP after LMA insertion in both study and control Groups.³

In Group A, there was slight but non-significant increase in the MAP after induction (P value = 0.015) and after LMA insertion (P value = 0.001). Change in the MAP at five and ten minutes after LMA insertion was also not significant in Group A.

In Group B, change in the MAP after induction was not significant (P value = 0.014), but after LMA insertion there was significant increase in the MAP (P = 0.0006). Also at five (P value = 0.0004) and ten (P = 0.0006) minutes after LMA insertion increase in the mean arterial pressure was significant. N. Braud and E.A.F. Clements (1989) demonstrated significant increase in the MAP after LMA insertion (P value < 0.001) and this increase in heart rate was sustained at one and three minutes after LMA insertion. The pattern of stress response obtained was comparable with the pattern stress response obtained in Group B patients in present study.²

I.G. Wilson, D. Fell, S.L. Robinson and G. Smith (1992) demonstrated no significant change in the MAP after LMA insertion.⁴ M.D Stoneham, Bree and Sneyd (1995) demonstrated a small but statistically insignificant increase IN MAP after LMA insertion in both study and control Groups.³ A prospective study of 1500 standardized LMA insertions by single experienced LMA user revealed a first attempt insertion rate of 95.5% and a failure rate after three attempts of 0.4%.⁵

Fibreoptic studies have shown that the LMA is stable during anaesthesia once it is placed correctly and fixed.⁶ Davitt et al (1994) demonstrated that ventilation through LMA is adequate at ventilation pressures varying from 15-30 cm of H₂O and comparable to ventilation through endotracheal tube. Leak fractions were consistently higher than for ventilation through endotracheal tube and increased with increasing airway pressure.⁷

Berry and Varghese reported no air leak with tidal volumes of 10ml/kg.⁸ Haden et al (1993) used technique of intermittent positive pressure through LMA in 93 patients with only two significant clinical problems.⁹

Safety of LMA in non-supine positions has not been demonstrated in large controlled trials. The prone position may be associated with an increased risk of regurgitation, but not

necessarily aspiration. Uneventful LMA use has been reported in 300 prone patients.¹⁰

S. McClune, M Regan, and J Moor described the use of LMA in a patient for emergency caesarean section when the tracheal intubation was not possible. The anaesthesia was maintained with the cricoid pressure in order to avoid aspiration.¹¹

CONCLUSION

Insertion of LMA (laryngeal mask airway) leads to significant stress response and Inj. xylocard (Lignocaine 2%) 1.5mg/Kg body weight 90 seconds prior to induction decreases stress response of LMA insertion. This technique will definitely add to the safety of anaesthetic management of patients who are at increased risk of harmful effects of stress response.

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 05-12-2015; **Published online:** 20-12-2015