Assessment of Changes in the Haemodynamic Parameters after Laryngeal Mask Airway Insertion.

Vaijayanti S. Gandhi[1], Basavaraj V. Modi[2]

[1]Assistant Professor, Department of Anesthesiology, Malla Reddy Medical College for Women, Hyderabad, India.
[2]Professor, Department of Anesthesiology, Malla Reddy Medical College for Women, Hyderabad, India

ABSTRACT

Background: Significant increase in heart rate and arterial blood pressure due to laryngoscopy and tracheal intubation have been associated with acute left ventricular failure, ruptured cerebral aneurysm, cardiac dysarrythmia and ischemia electrocardiographic changes. **Objective:** To assess changes in the haemodynamic parameters after laryngeal mask airway insertion. **Methods:** In this study, 80 patients of ASA grade I and II were randomly divided into two Groups A and B. All the patients of both the Groups were posted for elective surgery. Informed and written consent was obtained from the patients. Group A patients received Inj Lignocaine (Xylocard) 1.5 mg/kg intravenously 90 seconds before LMA insertion. Group B patients received inj. placebo (0.9% normal saline). Heart rate, blood pressure and SpO_2 were recorded at various periods. **Results:** There were significant changes in all the haemodynamic variables except DABP after LMA insertion. Intergroup comparison at ten minutes after LMA insertion shows significant changes in the heart rate and MAP only and the changes in the SABP and DABP were not significant. **Conclusion:** LMA insertion improves the conditions for LMA insertion. Although it does not abolish the pain of injection of Propofol completely, it does decrease the intensity of the pain in majority of patients.

Keywords: Laryngeal Mask, Airway, Haemodynamic.

INTRODUCTION

Many studies have compared the stress response of laryngeal mask insertion with that of the endotracheal intubation. They have shown attenuated but a similar pattern of stress response.[1] Significant increase in heart rate and arterial blood pressure due to laryngoscopy and tracheal intubation have been associated with acute left ventricular failure[2,3], ruptured cerebral aneurysm[4], cardiac dysarrythmias[5] and ischemic electrocardiographic changes.[3]

Although laryngeal mask insertion obviates need for laryngoscopy, stimulation of the pharynx and larynx during insertion and the pressure exerted by the cuff of laryngeal mask airway may initiate the stress response. A healthy person may tolerate this stress without any adverse effect, but this increase in heart rate and blood pressure can be harmful in some patients with a history of ischemic heart disease, hypertension and cerebrovascular diseases.[1]

Name & Address of Corresponding Author
Dr Vaijayanti S. Gandhi
Assistant Professor,
Department of Anesthesiology,
Malla Reddy Medical College for Women,
Hyderabad, India.
E mail: gandhivs7@gmail.com

Various methods have been advocated to attenuate this stress response. These methods utilize one of the following means to suppress the stress response.

1. Afferent blockade:
    a. Topical Lignocaine.
    b. Intravenous Lignocaine.
2. Central blockade:
    c. By deep planes of anaesthesia
    d. By central autonomic blockade (Droperidol)
3. Efferent blockade:
    e. Peripheral vasodilators-
        i. Sodium nitroprusside
        ii. Nitroglycerine
        iii. Hydralazine.
    f. Beta blockers-
        i. Propranolol
        ii. Esmolol
    g. Calcium channel blockers:
        i. Nifedepine
        ii. Verapamil
        iii. Diltiazem
4. α-1 Central agonist: Clonidine.

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Of all the above techniques, Lignocaine (Xylocard) is the most popular and extensively studied for decreasing the stress response of endotracheal intubation. This study is designed to assess the efficacy of Lignocaine (Xylocard) for decreasing stress response of laryngeal mask insertion.

The laryngeal mask airway literature was reviewed in anaesthesia review 10 in the year 1992. By the year 1992, it has been subject of 183 publications. Total publications since then have increased by six folds.

Large studies have confirmed the safety and efficacy of the device for spontaneous and controlled ventilation.

Safety and efficacy:

The prospective randomized studies from review journals have demonstrated that LMA is superior to the endotracheal tube and facemask in some areas of airway management.

MATERIALS AND METHODS

In this study, 80 patients of ASA grade I and II were randomly divided into two Groups A and B. All the patients of both the Groups were posted for elective surgery. Informed and written consent were obtained from the patients.

Group A patients received Inj. Lignocaine (Xylocard) 1.5 mg/kg intravenously 90 seconds before LMA insertion. Group B patients received inj. placebo (0.9% normal saline).

Heart rate, blood pressure and SpO_2 were recorded at various periods

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

The data obtained from the study were organized and analyzed by using Z test for difference between two means and Z test for difference between two proportions. (z>1.96 significant; p<0.001 is significant).

RESULTS

Table 1: Intergroup comparison of haemodynamic changes after induction.

Variable	Baseline		After Induction		Z value	P value
	Group A	Group B	Group A	Group B		
HR	82.7±10.1	78.1±7.53	82.2±9.48	78.6±6.03	0.433	NS
SABP	112±11	114±7.4	106.5±9.2	107±8	-1	NS
DABP	71.6±8.08	75.7%5.48	69.9±7.37	71.4±5.66	0.1	NS
MAP	85±7.4	88.1±5.44	81.5±6.63	85.4±5.31	1.1	NS

(Z >1.96 significant; p<0.001 is significant)

As per [Table 1] changes in the haemodynamic parameters after induction were not significant in both the Groups.

Table 2: Haemodynamic changes after LMA insertion.

Variable	Baseline		After LMA insertion		Z value	P value
	Group A	Group B	Group A	Group B		
HR	82.7±10.1	78.1±7.53	83.2±9.48	98.1±9.95	7.3	<0.0001
SABP	112±11	114±7.4	105±10.8	127±13	8.4	<0.0001
DABP	71.6±8.08	75.7%5.48	68.3±7.45	75±5.6	1.8	NS
MAP	85±7.4	88.1±5.44	80.1±6.23	92.4±6.19	8.9	<0.0001

(Z>1.96 significant; p<0.001 is significant)

As per above table there were significant changes in all the haemodynamic variables except DABP after LMA insertion.

Table 3: Haemodynamic changes at five minutes after LMA insertion.

Variable	Baseline		5 minute after LMA insertion		Z value	P value
	Group A	Group B	Group A	Group B		
HR	82.7±10.1	78.1±7.53	81.6±8.83	92.8±9.01	5.5	<0.0001
SABP	112±11	114±7.4	105±8.29	120±12.3	5.6	<0.0001
DABP	71.6±8.08	75.7%5.48	68.1±6.275	75±5.67	2.7	0.003
MAP	85±7.4	88.1±5.44	80.1±5.38	90.1±0.06	6.6	0.0001

(Z>1.96 significant; p<0.001 is significant)

As per above table there were significant changes in all the haemodynamic variables except DABP at five minutes after LMA insertion.

Table 4: Haemodynamic changes at ten minutes after LMA insertion.

Variable	Baseline		10 minutes after LMA insertion		Z value	P value
	Group A	Group B	Group A	Group B		
HR	82.7±10.1	78.1±7.53	81.7±9.31	90±9.01	3.9	<0.0001
SABP	112±11	114±7.4	107±9.06	115±11	2.7	0.003
DABP	71.6±8.08	75.7±5.48	67.6±6.42	75±5.6	3.3	0.0005
MAP	85±7.4	88.1±5.44	80±5.7	88.4±5.1	5.1	<0.0001

(z>1.96 significant; p<0.001 is significant)

Intergroup comparison at ten minutes after LMA insertion shows significant changes in the heart rate and MAP only and the changes in the SABP and DABP were not significant.

Table 5: Pain of injection of Propofol.

Grades	Group A	Group B	Significance
0	30(75%)	20(50%)	
I	10(25%)	14(35%)	Z = 3.77
II		06(15%)	(< 0.005)

(z>1.96 significant; p<0.001 is significant)

Above Table shows that in-Group A, out of 40 patients 30 (75%) patients had no pain of injection of Propofol and 10 (25%) patients had only mild discomfort. No patient's in-Group A had significant pain. In-Group B, out of 40 patients 20 (50%) patients had no pain, 14 (35%) patients had mild discomfort and 6 (15%) patients had significant pain.

Table 6: Ease of insertion of LMA.

Grades	Group A	Group B	Significance
Grade I	40	32	
Grade II:	0	8	
Coughing		6	Z = 3.77
Gagging		0	(P < 0.001)
Laryngospasm		0	
Movements of limbs		2	
Grade III	0	0	

(Z>1.96 significant; p<0.001 is significant)

Above Table show that there is a significant difference (P < 0.001) between Groups A and B with respect to ease of insertion of LMA. In Group A, in all the patients LMA insertion was successful without any laryngeal reflexes while in Group B, 8 patients had less satisfactory conditions for LMA insertion. Out of 8 patients, 6 patients had a successful insertion with coughing while 2 patients showed limb movement at the time of insertion of LMA.

DISCUSSION

In Group A, out of 40 patients, 30(75%) patients had no pain of injection of Propofol and 10 (25%)

patients had only mild discomfort. No patient's in Group A had significant pain. In Group B, out of 40 patients, 20 (50%) patients had no pain, 14 (35%) patients had mild discomfort and 6 (15%) patients had significant pain. Pascal Picard and Martin R Trammer (2000) studied effect of three different techniques on the pain of injection of Propofol. The three techniques were intravenous Lignocaine (Xylocard) with tourniquet for 50-130 seconds, Lignocaine (Xylocard) mixed with Propofol and Lignocaine (Xylocard) given just before giving Propofol. They concluded that Lignocaine (Xylocard) with tourniquet was superior compared to other two techniques.[4] D. Harmon, C. Rozaria and D. Lowe (2003) compared intravenous Lignocaine (Xylocard) and O_2: N_2O mixture in decreasing pain of injection of Propofol and stated the efficacy of two techniques were similar and Lignocaine (Xylocard) effectively decreased pain of injection of Propofol compared the control Group.[5] Yoshitaka Fujji and Masahiro Nakayama (2004 stated that Lignocaine (Xylocard) alone is not as effective as Lignocaine (Xylocard) with Flurbiprofen in decreasing pain of injection of Propofol.[6]

In Group A, in all the patients LMA insertion was successful without any laryngeal reflexes while in Group B, 8 patients had less satisfactory conditions for LMA insertion. Out of 8 patients, 6 patients had successful insertion with coughing while 2 patients showed limb movement at the time of insertion of LMA. Steinhaus and Gaskin (1979) studied effectiveness of Lignocaine (Xylocard) in cough suppression. They concluded that Lignocaine decreased the activity of pharyngeal and laryngeal reflexes. In their study Lignocaine (Xylocard) prevented cough in eight out of 10 patients.[7] Mullhollond and Carlistle (1991) also stated that intravenous Lignocaine effectively suppressed the airway reflexes, which could be beneficial for LMA insertion.[8] Stoneham, Bree and Sneyd (1995) studied effect of intravenous Lignocaine (Xylocard) on conditions for LMA insertion. In their study, there was significant improvement in the conditions for LMA insertion in patients given Lignocaine (Xylocard) intravenously before LMA insertion. Results of their study were comparable with the present study.[9]

CONCLUSION

LMA insertion improves the conditions for LMA insertion. Although it does not abolish the pain of injection of Propofol completely, it does decrease the intensity of the pain in the majority of patients.

REFERENCES

1. Braude N, Clements AEF, Hodges, Andrews BP. The pressure and laryngeal mask insertion – comparison with tracheal intubation. Anaesthesia. 1989; 44: 551-4.
2. Elisabeth JF, Garry S, Sklar MD. Complications related to pressor response to endotracheal intubation. Anaesthesiology. 1997; 47: 524-525.
3. Prys RC, Greene Lt, Meloche R, Foex P. Studies of anaesthesia in relation to hypertension II: haemodynamic consequence of induction and endotracheal intubation. Br J Anaesth. 1971;43(6):531-47.
4. Pascale PMD, Martin R. Trame`r, Prevention of Pain on Injection with Propofol: A Quantitative Systematic Review. Anesth Analg. 2000;90:963-9.
5. Harmon D, Rozario C, Lowe D. Nitrous oxide/oxygen mixture and the prevention of pain during injection of Propofol. European Journal of Anaesthesiology. 2003;20: 158–161.
6. Fujii Y, Nakayama M. Reduction of Propofol-Induced Pain through Pretreatment with Lidocaine and/or Flurbiprofen. Clin Drug Invest. 2004;24 (12):749-753.
7. Steinhaus JE, Gaskin LA. Study of lignocaine as suppressant of cough reflex. Anaesthesiology. 1963;24: 285-290.
8. Mullholland D, Carlistle RJT. Intubation with Propofol augmented with intravenous lignocaine. Anaesthesia. 1991; 46:312-313.
9. Stoneham M.D, Sneyd JR, Bree SE Facilitation of laryngeal mask insertion. Anaesthesia. 1995;50:464-466.

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