

Comparison of Mean Time for Jaw Relaxation between Sevoflurane and Propofol for Insertion of Laryngeal Mask Airway in Adult Patients

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ABSTRACT

Aim: To compare mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol.

Methods: Present Randomized controlled study was carried out in the Department of Anaesthesia and ICU and following Surgical Departments of Nishtar Hospital Multan: Gynaecology, General Surgery, Urology, Orthopaedics from June 2012 to December 2012. A total of 298 cases (149 in each group) fulfilling the inclusion/exclusion criteria were enrolled to compare mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol.

Results:-Majority of the patients in both groups between 41-50 years of age i.e., 51(34.23%) in Group-1 and 45(30.20%) in Group-2, mean and sd was calculated as 38.67±4.82 and 41.53±4.26 years respectively, 76(51.01%) male in Group-1 and 80(53.69%) in Group-2, 71(47.65%) in Group-1 and 63(42.28%) in Group-2 were between 40-60 kg while 78(52.35%) in Group-1 and 86(57.72%) in Group-2 were between 61-80 kg, comparison of mean time for adequate jaw relaxation for LMA insertion in both groups reveals 86.5±13.54 seconds in Group-1 and 73.22±14.87 in Group-2, p value was calculated as 0.00 which shows a significant difference between the two groups.

Conclusion: Comparison of mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol, we concluded that induction with propofol shows shorter duration as compared to sevoflurane for jaw relaxation

Key words: Jaw relaxation, LMA insertion, comparison, sevoflurane, propofol.

INTRODUCTION

Laryngeal Mask Airway (LMA) is being increasingly used in place of face mask or tracheal tube (TT) during administration of an anaesthetic, to facilitate ventilation and passage of TT in a patient with difficult airway and to aid in ventilation during fiberoptic bronchoscopy as well as placement of bronchoscope¹. Four types of LMAs are commonly used: the reusable LMA, an improved disposable LMA, the ProSeal LMA that allows nasogastric tube insertion and facilitates positive pressure ventilation, and a Fastrach LMA that facilitates intubation in patients with difficult airways¹. LMA insertion results in lesser presser response (Sympathetic stimulation resulting in increased heart rate and blood pressure) as compared to tracheal intubation after induction². The classical method of LMA insertion was recommended by Dr. Brain³. Insertion with cuff facing laterally or backward and rotating it forward into position has also been described³.

Satisfactory insertion of LMA after induction requires sufficient depth of anaesthesia and relaxation of jaw. There are various induction agents

currently in use to provide sufficient relaxation of jaw for LMA insertion. These are: intravenous propofol⁴, admixture of intravenous propofol and thiopentone⁵, vital capacity breath induction with 8% sevoflurane⁷, tidal volume breath induction with 8% sevoflurane¹¹, opioids with propofol⁸ and mini dose suxamethonium with propofol⁹. Each technique has its advantages and disadvantages. Propofol has got faster induction⁴, less complications^{4,6}, excellent recovery profile⁴, but is associated with pain on injection⁴ and hypotension^{4,5,6}. Thiopentone has got predictable action, requiring less time for induction but is associated with apnoea, allergic reactions and higher incidence of postoperative nausea and vomiting as compared to propofol^{5,6}. Inhalation induction with sevoflurane has good onset^{7,10} and easy to administer with lesser side effects⁷ and faster recovery¹⁰ but takes longer time for LMA insertion due to prolonged jaw tightness^{7,8}. Use of opioids with propofol results in less hemodynamic changes⁸.

Studies have been conducted in different regions to compare mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol: 98.2±10.34 sec versus 93.75±16.34 sec⁴ (held in India in 2005), 69.93±18.76sec versus 54.76±12.29 sec¹² (held in Turkey in 2010),

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80.0±18.61sec versus 75.1±15.10sec¹³ (held in Turkey in 2010), 140±42 sec versus 73±18sec¹⁴ (held in Lebanon in 2005) and 169±75sec versus 109±56sec¹⁵ (held in UK in 1997). All these studies show very wide differences in the mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol.

In our country, studies have been done on other aspects of LMA insertion like comparison of cardiovascular responses between LMA and TT, techniques of LMA insertion and use of remifentanyl and suxamethonium to facilitate LMA insertion but not on comparison of mean time for adequate jaw relaxation between these two regimens. As LMA is an important advancement in airway management and is being used increasingly in place of TT, so this study really needs to be done in our country to determine whether same differences exist in our population. The results of study will add up as a resourceful database which will be helpful to opt for the better modality. So this preference among the treatment modalities will be helpful in treatment and management protocols. Aim of this study was to compare mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol

MATERIAL AND METHODS

Present Randomized controlled study was carried out in the Department of Anaesthesia and ICU and following Surgical Departments of Nishtar Hospital Multan: Gynaecology, General Surgery, Urology, Orthopaedics from June 2012 to December 2012. A total of 298 cases (149 in each group) fulfilling the inclusion/exclusion criteria were enrolled to compare mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol.

RESULTS

Gender distribution of the patients shows 76(51.01%) male in Group-1 and 80(53.69%) in Group-2 while 73(48.99%) in Group-1 and 69(46.31%) in Group-2 were females. Weight of the patients in both groups was recorded, it shows 71(47.65%) in Group-1 and 63(42.28%) in Group-2 were between 40-60 kg while 78(52.35%) in Group-1 and 86(57.72%) in Group-2 were between 61-80 kg. Comparison of mean time for adequate jaw relaxation for LMA insertion in both groups was done which shows 86.5±13.54 seconds in Group-1 and 73.22±14.87 in Group-2, t test was applied and p value was calculated as 0.00 which shows a significant difference between the two groups.

Age distribution of the patients was done which shows majority of the patients in both groups

between 41-50 years of age i.e. 51(34.23%) in Group-1 and 45(30.20%) in Group-2, 21(14.09%) in Group-1 and 26(17.45%) in Group-2 were between 18-30 years,31(20.81%) in Group-1 and 34(22.82%) in Group-2 were between 31-40 years of age, while 46(30.87%) in Group-1 and 44(29.53%) in Group-2 were between 51-60 years of age, mean and sd was calculated as 38.67±4.82 and 41.53±4.26 years respectively (Table-1).

Age distribution of the patients was done which shows majority of the patients in both groups between 41-50 years of age i.e., 51(34.23%) in Group-1 and 45(30.20%) in Group-2, 21(14.09%) in Group-1 and 26(17.45%) in Group-2 were between 18-30 years, 20.81%(n=31) in Group-1 and 34(22.82%) in Group-2 were between 31-40 years of age, while 46(30.87%) in Group-1 and 44(29.53%) in Group-2 were between 51-60 years of age, mean and sd was calculated as 38.67±4.82 and 41.53±4.26 years respectively (Table-1).

Stratification for age of the patients was done in Table 2, which shows 74.35±13.21 in Group-1 and 84.2±12.87 seconds in Group-2 between 18-30 years, 76.27±14.42 in Group-1 and 88.43±16.43 seconds in Group-2 between 31-40 years, 74.86±12.56 in Group-1 and 87.53±12.26 seconds in Group-2 between 41-50 years, while 71.65±12.67 in Group-1 and 89.65±11.32 seconds in Group-2 between 51-60 years.

Stratification for gender of the patients was done and recorded, where 71.90±13.32 in Group-1 and 85.76±11.67 seconds in Group-2 were male while 70.45±12.93 in Group-1 and 86.33±10.65 seconds in Group-2 were females (Table 3).

Regarding stratification for weight of the patients, we recorded 72.63±12.44 in Group-1 and 81.32±10.62 seconds in Group-2 were between 40-60 kgs while 72.54±11.92 in Group-1 and 83.22±12.89 seconds in Group-2 were between 61-80 kgs. (Table-4)

Table 1: Age distribution of the patients (n=298)

Age (years)	Group-1	Group 2
18-30	21(15%)	26(15.5%)
31-40	31(20.8%)	45(30.5%)
41-50	51	34
51-60	46(30.9%)	44(29.5%)
Total	149(100%)	149(100%)
Mean SD	38.67±4.82	1.53±4.26

Table-2: Stratification for age of the patients (n=298)

Age(yrs)	Group-1	Group 2	P value
18-30	74.35±13.21	84.2±12.87	0.00
31-40	76.27±14.42	88.43±16.43	0.00
41-50	74.86±12.56	87.53±12.26	0.00
51-60	71.65±12.67	89.65±11.32	0.00

Table- 3: Stratification for gender of the patients (n=298)

Sex	Group 1	Group 2	P.value
Male	71.90±13.32	85.76±11.67	0.0001
Female	70.45±12.93	86.33±10.65	0.0012

Table 4: Stratification for weight of the patients (n=298)

Weight (kg)	Group-1	Group=2
40-60	72.63±12.44	81.32±10.62
61-80	72.54±11.92	83.22±12.89

DISCUSSION

Satisfactory insertion of the Laryngeal Mask Airway after induction of anaesthesia requires sufficient depth for suppression of airway reflexes¹⁶. A popular method of providing anaesthesia for Laryngeal Mask Airway insertion is with the use of IV Propofol, which has the advantages of inducing anaesthesia rapidly and depressing upper airway reflexes. However bolus IV Propofol has been associated with adverse effects like hypotension, apnea and pain on injection^{17,18}.

The reason behind conduction of this study was that in our country, trials have been done on other aspects of LMA insertion like comparison of cardiovascular responses between LMA and TT, techniques of LMA insertion and use of remifentanil and suxamethonium to facilitate LMA insertion but not on comparison of mean time for adequate jaw relaxation between these two regimens. As LMA is an important advancement in airway management and is being used increasingly in place of TT, so this study was required to be done in our country to determine whether same differences exist in our population. The results of study would add up as a resourceful database which will be helpful to opt for the better modality. So this preference among the treatment modalities will help in treatment and management protocols.

On comparison of mean time for adequate jaw relaxation for LMA insertion in both groups, we revealed 86.5±13.54 seconds in Group-1 and 73.22±14.87 in Group-2, t test was applied and p value was calculated as 0.00 which shows a significant difference between the two groups.

The findings of the study are in agreement with Ozgok A and colleagues¹³ who revealed 80.0±18.61sec versus 75.1±15.10sec. While other studies in different regions to compare mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol: reveals 98.2±10.34sec versus 93.75±16.34 sec⁴ (held in India in 2005), 69.93±18.76sec versus 54.76±12.29 sec¹² (held in Turkey in 2010), 140±42 sec versus 73±18sec¹⁴ (held in Lebanon in 2005) and 169±75sec versus 109±56sec¹⁵(held in UK in 1997) are having the difference regarding time duration but all the above

studies are in agreement with regards to shorter duration of time for jaw relaxation in patients induced with propofol. These findings justifies the hypothesis of the study that “there is a difference in the mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol”.

Similarly, Hall et al reported longer time to jaw relaxation with sevoflurane compared with propofol, although they did not postulate any reasons for it¹⁹. However, considering the results of the study with support of above mentioned other studies it is clarified that propofol for insertion of laryngeal mask airway in adults patients take shorter duration of time as compared to Sevoflurane for the relaxation of jaw.

CONCLUSION

Comparison of mean time for adequate jaw relaxation for LMA insertion between sevoflurane and propofol, we concluded that induction with propofol shows shorter duration as compared to sevoflurane for jaw relaxation

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