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COMPARITIVE STUDY ON INDUCTION TIME AND OVERALL EASE OF LMA INSERTION BETWEEN SEVOFLURANE AND PROPOFOL

Dr..B.Velmurugan M.D DA Senior Assistant Professor of Anesthesia, Institute of Anaesthesiology, Govt. Rajaji Hospital, Madurai Medical College, Madurai – 625020. - Corresponding Author

Dr. Aishwarya Post Graduate Institute of Anesthesia, Institute of Anaesthesiology, Govt. Rajaji Hospital, Madurai Medical College, Madurai – 625020.

ABSTRACT **BACKGROUND:** laryngeal mask airway has found to be a more effective ventilating device than the face mask and to cause less stimulation of protective reflexes and of the cardiovascular system than endotracheal tube. The purpose of this prospective study to assess LMA insertion conditions of Sevofluane (8%) in comparision with Propofol.

METHODS: 60 patients were randomly allocated to Group S : Inhalation induction using 8.1 sevoflurane Group P : Intravenous induction with propofol 2 mg / kg

RESULTS the induction with propofol is superior, the clinical conditions for LMA insertion obtained with inhalational induction 8% sevoflurane is satisfactory using loss of verbal contact as the end point. Hence induction with 8% sevoflurane may provide an alternative to IV propofol for the insertion of CMA in adults, if adequate jaw relaxation as the end point of induction

KEYWORDS : sevoflurane, propofol, LMA, Induction time

1.INTRODUCTION

Laryngeal mask airway, a new airway device that has been added to the anesthesiologists armamentarium, was invented by Dr. Archie brain in 1983.[1] Initially laryngeal mask airway was recommended as a better alternative to face mask for airway management in anesthetized patients. Soon after its introduction into the clinical practice in 1988, the laryngeal mask airway has found to be a more effective ventilating device than the face mask and to cause less stimulation of protective reflexes and of the cardiovascular system than endotracheal tube. The insertion of laryngeal mask airway stimulates the hard and soft palate, posterior pharyngeal wall and hypopharynx for this procedure, requires adequate anaesthesia but the depth of anaesthesia required is less compared to endotracheal intubation.[2] The main advantage laryngeal mask airway insertion over endotracheal intubation in avoidance of muscle relavant and minimal cardiovascular response.For successful laryngeal mask airway insertion, intravenous induction agents like propofol and thiopentone along with opiods, midazolam and lignocaine are used.The purpose of this prospective study to assess LMA insertion conditions of Sevofluane (8%)in comparision with Propofol.

2.AIM

To compare the induction time, overall case of LMA insertion in sevofluane (87%) and propofol.

3.METHODS AND MATERIALS

This is a prospective randomized study conducted at Government Rajaji Hospital, attached to Madurai Medical College. After obtaining approval by the ethics committee and informed consent, a total of 60 patients belonging to AS physical status 1 and 2 of either gender and aged between 15-65 yrs, scheduled for elective general and urological procedures were enrolled for this study. Patients requiring endotracheal intubation, morbidity obese, anticipated difficult airway with Mallampatti class 3 & 4, pregnant patients and those with H/o gastro esophageal reflex were excluded from the study.All patients were kept nil per orally for atleast 12 hrs. They were premedicated with 3 alycopyrrolate 0.2 mg IM 30 min. before prior to induction of anaesthesia. The patients were randomly allocated to one of the two groups.

Group S : Inhalation induction using 8.1 sevoflurane
Group P : Intravenous induction with propofol 2 mg / kg

Monitoring consisted of pulse rate, oxygen saturation (SPO2) and non invasive blood pressure at one minute intervals up to 5 minutes of induction. After recording the base line values, all patients received fentany l2 mg/kg. They were then preoxygenated with 100% O2 for 3 minutes. Group P :Patients received propofol 2mg / kg -1 body weight with 100% O2 via face mask through Magill's circuit. Group S :Patients received 8% sevoflurane with N2O and O2 50% each at fresh gas flow rate of 8lit min-1. through Magill's circuit. The patients were instructed to take breaths as deep as possible.The loss of verbal contact was considered as the desired end-point for induction in both the techniques, which was assessed by the response to calling out the patient's name. after loss of response to verbal contact, appropriate size LMA was inserted by the theatre anaesthesiologist who is unaware of the drugs used. The LMA was inserted by the standard technique as described by Dr. Brain. During LMA insertion, the person who inserts the LMA will assess the case of LMA insertion.

The following observation are made

1. The time for induction ie. The time (in secs) taken from induction of anaesthesia to loss of verbal contact.
2. Conditions for LMA insertion and patients response.

They were graded on a three point scale using variables.

The overall conditions for LMA insertion were assessed as excellent, satisfactory or poor on the basis of the total score obtained by summing up the individual scores of each components. Maximum total score 18. Excellent if 18, satisfactory if 16-17, and poor if <16.

3. Haemodynamic parameters, (blood pressure and pulse rate) were recorded at baseline, and every minute for five minutes after induction.

After insertion of LMA, the cuff has inflated with the prescribed volume of air. Size 3 or 4 LMA was used in this study. After securing the LMA< anaesthesia was maintained with 66% Nitrooxide in Oxygen, halothane and non-depolarizing muscle relaxants.

Statistical Tools

The information collected regarding all the selected cases were recorded in a Master Chart. Data analysis was done with the help of computer using Epidemiological Information Package (EPI 2002) developed by Centers for Disease Control and Prevention (CDC), Atlanta for W.H.O. Using this software, frequencies, percentage, range, mean, standard deviation, x^2 and 'p' values were calculated. A 'p' value less than 0.05 is taken to denote significant relationship.

4. RESULTS AND DISCUSSION:

The popular method of anaesthetic induction for laryngeal mask airway insertion is the use of intravenous propofol which has the advantage of rapid onset, short duration of action and depression of airway reflexes. However several adverse effects have been associated with propofol including hypotension, greater respiratory depression (apnea) and pain on injection. Recently sevoflurane seems to be an ideal agent for inhalational induction. It is suitable for quick inhalational induction in high concentrations because of its low blood gas solubility and minimal respiratory irritant effect. The vital capacity induction technique with sevoflurane was used to make the technique

similar to that of intravenous bolus injection of propofol. But the modified vital capacity breath induction with sevoflurane is convenient. We used magill's system for both preoxygenation and induction with 8% sevoflurane in Group S and propofol 2mg/kg in Group P. Fentanyl was used as a coinduction agent because of known synergistic effect of opioids with both sevoflurane and propofol.

INDUCTION TIME:

The time to loss of verbal contact, indicating the end point of induction was 44.17+2.95 sec in group P compared to 50.07 + 3.6 sec in Group S. This correlates well with the study Priya et al [3] who showed that in induction time in group P was 41.7 + 10.1 sec and in Group S was 51.1+10.4 sec. Hence the induction was more rapid with IV propofol than with 8% sevoflurane. Kati et al also found that induction was significantly longer in sevoflurane group as compared to propofol group.[4] In a related study, muzi et al also achieved insertion of LMA after sevoflurane induction in 1.7 minutes which was longer than with propofol group.[5]

Table 1: Induction Time

Induction time in minutes	Propofol Group	Sevoflurane Group
Mean	44.17	50.07
S.D	2.95	3.6
'p'	0.0001 (Significant)	

SUCCESSFUL INSERTION AT FIRST ATTEMPT :

The successful insertion at first attempt was more in group P (93.3%) than group S (86.7%) which was statistically insignificant (p=0.3934). This is also comparable to study by ravikumar koppula et al [6] who had successful insertion at first attempt in 95% in both groups and priya et al[3] had 84% in both groups.

Table 2 : Number of attempts

No. of attempts	Propofol Group		Sevoflurane Group	
	No	%	No	%
1	28	93.3	26	86.7
2	2	6.7	4	13.3
Mean S.D	1.07 0.25		1.13 0.35	
'p'	0.3934 (Not Significant)			

PATIENT'S RESPONSE TO LMA INSERTION :

A full jaw muscle relaxation was achieved in 90% of patients in Group P and 60% of patients in Group S. This is similar to study by priya et al[3] who had adequate jaw opening in 82% in Group P and 54% in Group S. This is due to the well known effect on jaw muscles by propofol whereas inhalational anaesthetics may cause an increased muscle tone and spasticity. Therefore, for a similar end point of induction ie. Loss of verbal contact, there may be greater jaw muscle relaxation with propofol.

Modulate movements either head or limbs are present only in 6.7% of patients in Group P compared to 36.7% in Group S which is statistically significant. This is similar to the study by mary e molloy et al[7] who had head or limb movements in 34% of patients in Group S and 9.3% in Group P.

The other adverse responses like coughing, gagging and laryngoscopasm were did not reach statistical significance in this study which is similar to mary & molloy et al[7] study who showed that the modified vital capacity inhalational technique with sevoflurane is associated with less airway complications and also provides good conditions for LMA insertion, especially when used with 50% N2O in O2. Ian smith et al[8] also revealed that inhalational induction with sevoflurane was not associated with clinical signs of respiratory irritation, coughing, laryngospasm or excessive oral secretions. Koppula et al[9] also showed coughing in only one patient and no incidence of gagging and laryngospasm which also correlates with this study.

OVERALL CONDITIONS FOR LMA INSERTION :

Excellent inserting conditions with minimal adverse reactions were seen in more number of patients in Group P. In group P excellent conditions were seen in 84% of the patients whereas in Group S in 50% of patients Analysis of the total scores for conditions for LMA insertion was done. The mean score in Group P was 17.67 + 0.8 and in Group S was 16.87 + 1.48 with 'p' value of 0.0099 which is statistically significant. This is similar to the study by PRIYA et al for whom the mean score was 17.5 + 0.77 in Group P and 16+1.15 in Group S (p=0.012). Hence LMA insertion was superior with propofol than with sevoflurane.

Table 3 : Overall assessment

Overall assessment	Propofol Group		Sevoflurane Group	
	No	%	No	%
Poor	1	3.3	5	16.7
Satisfactory	5	16.6	10	33.3
Excellent	24	80	15	50
MEAN SCORE	17.67		16.87	
SD	0.8		1.48	
'p'	0.0099 (Significant)			

The aim of this study is to compare the induction time, overall case of LMA insertion in sevoflurane and propofol group. Of the two groups compared in this study, the induction time in propofol group was rapid (44.17+2.95sec) and also inserted in first attempt in 93.3% of patients. It also offered excellent conditions in 80% and satisfactory conditions in 16.6% of patients for LMA insertion with minimal adverse response. But the decrease in mean arterial pressure and pulse rate was statistically significant compared with baseline, but was not regarded as clinically significant.In sevoflurane group, the induction time was little prolonged (50.07 + 3.6sec) comparing with propofol and successful insertion at first attempts was 86.7% which is comparable to the propofol group. The overall conditions for LMA insertion was excellent in 50% and satisfactory in 33.33% of patients with adverse responses like moderate movements of the patients. The decrease in pulse rate and mean arterial pressure was not statistically significant when compared to propofol group.

5. CONCLUSION

To conclude, though the induction with propofol is superior, the clinical conditions for LMA insertion obtained with inhalational induction 8% sevoflurane is satisfactory using loss of verbal contact as the end point. Hence induction with 8% sevoflurane may provide an alternative to IV propofol for the insertion of CMA in adults, if adequate jaw relaxation as the end point of induction

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