Section: Anaesthesiology

Research

COMPARISION OF SEVOFLURANE INDUCTION VERSUS PROPOFOL INDUCTION FOR INSERTION OF LARYNGEAL MASK AIRWAY IN ADULTS

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Abstract

Background: A popular method of providing anaesthesia for laryngeal mask airway (LMA) insertion is with the use of Propofol. However, bolus Propofol has been associated with adverse effects such as hypotension, apnoea and pain on injection. Hence, time is needed to search an alternative. The aim is to evaluate the mean time required for induction with Propofol compared to Sevoflurane to insert laryngeal mask airway– A prospective randomized comparative clinical study. **Materials and Methods:** The prospective randomized study was carried out in adult patients of age groups between 18 – 60 years posted for various elective surgical procedures of less than 1 hour duration. The study population consists of 60 ASA grade I & II patients aged between 18- 60 years. They were divided into 2 groups of 30 each. The hemodynamic changes during LMA insertion, quality of insertion of LMA, and time taken for LMA insertion were assessed and compared. **Result:** Quality of insertion was excellent in all patients with Propofol. With Sevoflurane, quality of insertion ranged from excellent to satisfactory. Airway related incidents were more in Sevoflurane group compared to Propofol group. Patient's movements were noted in the Sevoflurane group but there is no statistical significance. More number of attempts for LMA insertion was required in Sevoflurane group and is statistically significant. Induction of anaesthesia with Sevoflurane was associated with advantages that mean arterial pressure better maintained with Sevoflurane compared to Propofol. **Conclusion:** Sevoflurane is associated with good hemodynamic stability but quality of anaesthesia provided with Propofol is better. Time for jaw relaxation is prolonged with Sevoflurane compared to Propofol, which may delay laryngeal mask airway insertion.

INTRODUCTION

Airway management is the most important fundamental aspect in the field of anaesthesiology and critical care. Every anaesthesiologist should first acquire the skill to keep the airway patent. Inability to secure the airway can lead to many devastating results. Following general anaesthesia, there is a loss of upper airway reflexes, which results in accidental aspiration of gastric contents into the tracheo-bronchial tree with lung injury. The most important crucial step following the administration of general anaesthesia is endotracheal intubation.

Endotracheal intubation was first used in anaesthesia in 1878 and is considered as the gold standard for airway management as it is a simple, rapid, safe, non-surgical technique and achieves all the goals of airway management such as protecting lungs from aspiration, maintaining airway patency, permitting leak-free ventilation and also for delivering aesthetic gases to patients during general anaesthesia. However, it often requires neuromuscular blockade, may cause damage to vocal cords, tracheal mucosa and, also cause tachycardia and hypertension due to sympathetic overactivity.

An alternative to this method in fasting and spontaneously breathing patients are using a facemask with or without oropharyngeal airway. But there are many problems while using a facemask, such as difficulty maintaining a seal especially,[1] for long procedures, facial characteristics of patients,

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particularly those with a beard or without teeth and, considerable fatigue for holding mask for longer periods.

All these problems led to the discovery of Laryngeal Mask Airway (LMA) in 1981 by Dr. Archie Brain in United Kingdom. After prolonged research, it was released in 1988 after recognizing its potential in managing the difficult airway. At first, it was inserted under deep halothane anesthesia blindly. A satisfactory airway was obtained, and gentle, positive pressure ventilation was given to inflate the lungs. After observing about seventy prototypes and performing on thousands of patients, commercial interest was aroused. By 1990 September, all the British hospitals had ordered the laryngeal mask, and now it is used extensively throughout the world.

Nowadays, Laryngeal Mask Airway has largely replaced endotracheal intubation for cases where intubation is difficult or aspiration is not a problem.[2] Satisfactory insertion of LMA requires suppression of airway reflexes after induction of anesthesia with sufficient depth; else, it is associated with various complications such as coughing, gagging, and laryngospasm. Insertion of LMA is associated with less tachycardia, hypertension, airway stimulation, postoperative pharyngeal discomfort, and dysphonia compared to endotracheal intubation as it doesn't stimulate the trachea.[3] The major drawbacks associated with LMA insertion include aspiration and gastro-oesophageal reflux.

Various sizes of LMA's are available for patients with different age groups depending upon their weight. Both reusable and disposable versions of LMA's are being used. Examples of various types of LMA's include LMA Classic, LMA Proseal, flexible LMA, intubating LMA like Fastrach, LMA Supreme, I-gel, and C-trach. Both inhalational agents such as sevoflurane and intravenous agents such as Thiopentone, Propofol, and Etomidate are used for insertion of LMA. Among these, Sevoflurane and Propofol are the most commonly used agents for the insertion of LMA.[4] Propofol, an intravenous anesthetic agent, is a phenol derivative and has properties of rapid induction and recovery. It is used for induction and maintenance of anesthesia and sedation in intensive care units. Intravenous Propofol (1%) has been used as a choice of induction agent for insertion of LMA. It suppresses the airway reflexes adequately and allows smooth insertion of LMA. In spite of all these advantages, Propofol also has some disadvantages such as a profound fall in blood pressure, pain on injection, and apnoea.

Sevoflurane is a halogenated volatile anesthetic agent with a pleasant smell and is non-irritant to the airways. It has a smooth and rapid induction and emergence in both children and adults.[5] These properties of Sevoflurane make it a good choice for LMA insertion. It can be used as an alternative to intravenous induction agents for LMA insertion.

In this prospective randomized comparative clinical study, comparision of the induction characteristics, ease of laryngeal mask airway insertion, hemodynamic complications, and any complications occurring during laryngeal mask airway insertion with Propofol versus Sevoflurane was done.

MATERIALS AND METHODS

The prospective randomized study was carried out in adult patients of age groups between 18 - 60 years posted for various elective surgeries at Government General Hospital, Vijayawada, from June 2022 to November 2022

The study population consists of 60 ASA grade I & II adult patients aged between 18 – 60 years coming for elective surgical procedures of less than 60 minutes duration of Mallampati class I & II airway anatomy.

After approval of the study by institutional ethical committee and obtaining written informed consent, patients were randomized into two groups of 30 each, i.e. Group P, and Group S.

Inclusion Criteria

Patients of either sex, between the age groups of 18 – 60 years belonging to ASA grade I & II undergoing elective surgical procedures of less than one hour duration. Mallampati Class I & II.

Exclusion Criteria

Patients with restricted mouth opening or history or evidence of difficult airway, Morbidly obese, at risk of aspiration, Pregnancy, with a history of malignant hyperthermia, with a previous history of allergy to volatile anesthetics or propofol. A thorough pre-anesthetic evaluation was conducted on the day before surgery. A detailed history and cardio-respiratory examination were carried out in all the patients. All relevant investigations were done.

On the day of surgery, after the arrival of the patient to the operation theatre, pulse-oximeter, ECG, and non-invasive blood pressure monitors were connected. The baseline heart rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure were recorded.

After doing a thorough cockpit drill of continuous flow anesthesia machine and availability of emergency drugs, an intravenous line with Ringer's Lactate was secured using an 18G intravenous cannula. Prior to induction, all patients were pre medicated with IV Glycopyrrolate 0.005 mg/kg, IV Midazolam 0.03 mg/kg, IV Fentanyl 2 µgm/kg.

All patients were pre-oxygenated with 100% oxygen at 8 L/min with a 2 liter reservoir bag for 3 minutes. Anesthesia was then induced in Group P(Propofol) with IV Propofol 2 mg/kg over 30 seconds along with N2O 50% with O2 (flow- 6L/min). Lignocaine 0.3 mg/kg IV is added to Propofol to prevent pain on injection. Later Propofol infusion was maintained at a rate of 50µgm/kg/min along with N2O 50%

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with O2 (flow- 6 L/min). Group S (Sevoflurane) patients were induced by a mask with Sevoflurane starting at 2% and incrementally increased to 8% inhaled concentration over 30 seconds with 50% N2O in oxygen at 8 L/min and maintenance with 1.5-2% Sevoflurane. The point of start of Propofol injection or the introduction of Sevoflurane 8% were considered as the start point for induction.

Loss of verbal contact was considered as the endpoint of induction in both groups. The time for induction is the time taken from induction of anesthesia to loss of verbal contact. Time for jaw relaxation is the time taken from induction of anesthesia to full jaw opening. The time for LMA insertion is the time taken from induction of anesthesia to successful LMA insertion. Once jaw relaxation was adequate, LMA insertion was attempted.

HR, SBP, DBP, and MAP were monitored from the beginning of induction and at 1, 2 and 5 minutes after LMA insertion. The study concluded at 5 minutes after LMA insertion.

Appropriate-sized LMA was inserted by the standard method described by Brain. LMA insertion parameters such as jaw opening, ease of insertion, and any side effects such as coughing, gagging, laryngospasm, and patient movements were assessed by the anaesthesiologist who inserted LMA and were graded to a total score of 18.

Grading of lMA characteristics during lMA insertion

Parameter	Grade 3	Grade 2	Grade 1
Jaw Opening	Full	Partial	Nil
Ease of insertion	Easy	Difficult	Impossible
Coughing	Nil	Minor	Severe
Gagging	Nil	Minor	Severe
Laryngospasm	Nil	Partial	Total
Patient movements	Nil	Moderate	Severe

Score

18-Excellent

16- 17-Satisfactory

< 16-Poor

The parameters were studied during the procedure are Time taken for induction, jaw relaxation, and LMA insertion, number of attempts for LMA insertion, Change in heart rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure during induction and insertion, LMA insertion characteristics based on the scoring system.

Descriptive data are presented as Mean ± SD and in percentage. Multiple group comparisons were made by one-way ANOVA followed by unpaired t-test for pairwise comparison for all tests with a ‘p’ value of < 0.05 was considered for statistical significance.

RESULTS

Both groups were found to be statistically similar with respect to age, sex distribution. [Table 1]

In Group P, 23 patients were used LMA size 3, and 7 patients were used LMA size 4 for surgical procedures. In Group S, 21 patients were used LMA size 3, and 9 patients were used size 4 for surgical procedures. All patients in Group P had successful LMA insertion in 1st attempt. In group S, 26 patients had successful LMA insertion in 1st attempt, and 4 patients had successful LMA insertion on 2nd attempt. The number of attempts was more in Group S compared to group P, which is statistically significant ($p < 0.05$). [Table 2]

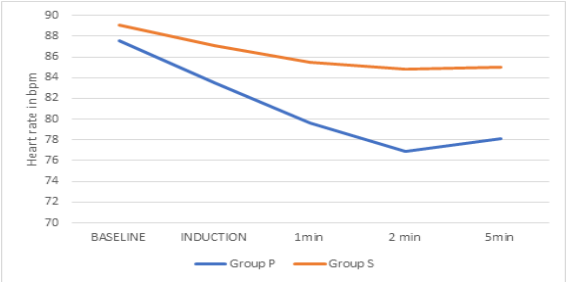

Figure 1: Comparison of changes in heart rate

The heart rate at baseline and at the time of induction was comparable between the two groups. Heart rate at 1 minute, 2 minutes, and 5 minutes interval after insertion of LMA showed a fall in heart rate with the Propofol group, which is clinically and statistically significant with a p-value of <0.05 compared to the Sevoflurane group.

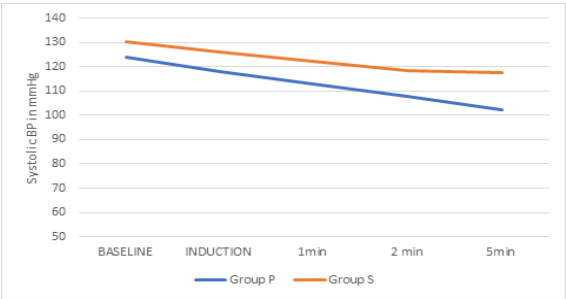

Figure 2: Comparision of changes in systolic blood pressure (SBP)

The Systolic Blood Pressure before and after induction, and at 1minute, 2 minutes, and 3 minutes interval after insertion of LMA, showed a fall in SBP with the Propofol group, which is statistically significant (p-value <0.05) compared to the Sevoflurane group.

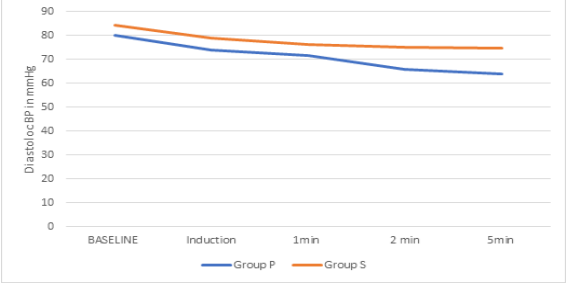

Figure 3: Comparision of changes in diastolic blood pressure (DBP)

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The Diastolic Blood Pressure before and after induction, and at 1 minute, 2 minutes, and 5 minutes interval after insertion of LMA showed a fall in DBP with the Propofol group, which is statistically significant (p-value <0.05) compared to the Sevoflurane group.

Table 1: Age and weight distribution in present study

Age (in years)	Group P				Group S			
	MEAN	S.D	NO	%	MEAN	S.D	NO	%
15 – 30	25.13	4.02	8	26.67	24.44	3.75	9	30
31 – 45	38.82	5.08	11	36.67	38.44	4.59	9	30
46 – 60	51.89	4.70	9	30	53.27	3.61	11	36.67
61 -75	63.50	12.73	2	6.67	62.00	0.00	1	3.33
TOTAL	40.73	12.73	30	100	40.47	13.15	30	100
Weight								
31 - 40	37.50	3.54	2	6.67	--	--	0	0
41- 50	46.83	3.13	6	20	47.00	1.91	12	40
51-60	55.75	3.17	16	53.33	55.43	2.14	14	46.67
61- 70	65.20	3.03	5	16.67	65.25	3.40	4	13.33
71- 80	72.00	0.00	1	3.33	--	--	0	0

Table 2: Comparison of variable in between 2 groups

ASA Grade	Group P		Group S	
	NO.	%	NO.	%
1	21	70%	23	76.7%
2	9	30%	7	23.3%
LMA size				
3	23	76.7%	21	70%
4	7	23.3%	9	30%
No. of attempts				
1	30	100%	26	86.7%
2	0	0%	4	13.3%

Table 3: Comparision in changes in mean arterial blood pressure (MAP)

MAP	Group P	Group S	P-value
BASELINE	94.30±6.59	99.37±6.85	0.005
INDUCTION	88.57±5.04	94.43±5.82	<0.01
1min	85.03±5.54	91.70±5.20	<0.01
2 min	79.90±6.50	88.70±6.58	<0.01
5min	76.00±8.29	88.77±8.22	<0.01

The mean MAP before and after induction and at 1 minute, 2 minutes, and 3 minutes intervals after insertion of LMA showed a fall in MAP with Propofol group, which is statistically significant (p-value <0.05) compared to Sevoflurane group.

Table 4: Comparison of time taken for events (in seconds)

TIME OF EVENTS	Group P		Group S		P-value
	MEAN	S.D	MEAN	S.D	
Loss of verbal contact	52.83	11.27	69.33	9.80	<0.01
Time to jaw relaxation	71.50	12.33	110.50	13.02	<0.01
Time for LMA insertion	83.17	12.07	128.00	13.81	<0.01

Sevoflurane group required more time for jaw relaxation and insertion of LMA. Loss of verbal contact, adequate jaw relaxation, and LMA insertion was earlier with Propofol than Sevoflurane, and are statistically significant with a p-value of < 0.05 (p- value < 0.01).

Table 5: Comparison of grading of conditions for laryngeal mask airway insertion

Parameters	Grading	Group P		Group S		Total		P-value
		No	%	No	%	No	%	
Jaw opening	2	0	0%	2	6.7%	2	3.3%	0.492
	3	30	100%	28	93.3%	58	96.7%	
Ease of insertion	2	0	0%	2	6.7%	2	3.3%	0.492
	3	30	100%	28	93.3%	58	96.7%	
Coughing	3	30	100%	30	100%	60	100%	--
Gagging	2	1	3.3%	0	0%	1	1.7%	1.00
	3	29	96.7%	30	100%	59	98.3%	
Laryngospasm	3	30	100%	30	100%	60	100%	--
Patient movements	2	0	0%	2	6.7%	2	3.3%	0.492
	3	30	100%	28	93.3%	58	96.7%	

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LMA insertion conditions like jaw opening and ease of insertion were excellent with Propofol compared to Sevoflurane, but there is no statistical significance (p – 0.492). Moderate patient movements were observed in 2 out of 30 patients in Group S, and no patient movements were observed in Group P, but there is no statistical significance (p – 0.492).

DISCUSSION

In this study, the quality and time required for successful LMA insertion in adult patients after Sevoflurane vital capacity breaths inhalational induction and Propofol an intravenous induction were compared. All patients were pre-oxygenated with 100% oxygen at 8 L/min with a 2 Liter reservoir bag for 3 minutes. Anesthesia was then induced in Group P(Propofol) with IV Propofol 2 mg/kg over 30 seconds along with N2O 50% with O2 (flow- 6L/min). Lignocaine 0.3 mg/kg IV is added to Propofol to prevent pain on injection. Later, Propofol infusion was maintained at a rate of 50µgm/kg/min along with N2O 50% with O2 (flow-6 L/min). Group S (Sevoflurane) patients were induced by a mask with Sevoflurane starting at 2% and incrementally increased to 8% inhaled concentration over 30 seconds with 50% N2O in oxygen at 8 L/min and maintenance with 1.5-2% sevoflurane.

Mona Sharma, Renu Sinha, Anjan Trikha, Rashmi Ramachandran, and C Chandralekha compared the effects of different gases for LMA cuff inflation.[6] Air was used in Group A, 50% O2: air in Group OA, 50% O2:N2O in Group ON, and 100% O2 in Group O. Cuff pressure, cuff volume, and ventilator parameters were monitored intraoperatively. They concluded that, cuff inflation with 50% O2: N2O mixture provided more stable cuff pressure than compared to air, O2: air, and 100% O2 during O2: N2O anesthesia.

Fentanyl was used as a co-induction agent because of the known synergistic effects of opioids with sevoflurane and Propofol. Ganatra SB, D'mello J, Butani M, and Jhamnani P,[5] conducted a pilot study to compare the conditions for insertion of LMA between Sevoflurane 8% and Propofol 2.5 mg/kg with fentanyl 1µg/kg as a co-induction agent and found that induction to successful laryngeal mask insertion time was significantly shorter with Propofol compared with Sevoflurane. There was a faster induction with Propofol-fentanyl, but conditions for insertion of the laryngeal mask airway were similar in both groups. However, hemodynamic stability was better with Sevoflurane-fentanyl, and systolic and diastolic blood pressures were lower in the Propofol group. They concluded that Propofol-fentanyl combination was found to be more cost-effective.

In the present study, patients were randomly divided into 2 groups of 30 each, i.e., Group P and Group S. Patient's responses to LMA insertion were noted and graded. Jaw relaxation, ease of insertion, coughing, gagging, laryngospasm, and patient movements was graded. For assessing hemodynamic status – pulse rate, systolic blood pressure, diastolic blood pressure, and mean arterial blood pressure were recorded at baseline before induction of anaesthesia, at the time of induction, and at 1 minute, 2 minutes, and 5 minutes interval after insertion of LMA.

The two groups were comparable, and there was no statistically significant difference between the mean ages, sex, and weight. In this study, the optimal age range was 18 to 60 years. The heart rate at baseline, and at the time of induction were comparable between the two groups. Heart rate at 1minute, 2 minutes, and 5 minutes interval after insertion of LMA showed a fall in heart rate with Propofol group, which is clinically and statistically significant with a p-value of <0.05, i.e., with p values of 0.011, 0.004, and 0.010 respectively when compared to Sevoflurane group.

The Systolic Blood Pressure before and after induction and at 1minute, 2 minutes, and 3 minutes interval after insertion of LMA showed a fall in SBP with the Propofol group, which is statistically significant (p-value <0.05) compared to the Sevoflurane group. The Diastolic Blood Pressure before and after induction and at 1 minute, 2 minutes, and 5 minutes interval after insertion of LMA showed a fall in DBP with Propofol group, which is statistically significant (p-value <0.05) compared to the Sevoflurane group. The mean MAP before and after induction and at 1 minute, 2 minutes, and 3 minutes intervals after insertion of LMA showed a fall in MAP with Propofol group, which is statistically significant (p-value <0.05) compared to Sevoflurane group. Induction of anaesthesia with Sevoflurane was associated with advantages that mean arterial pressure was better maintained with Sevoflurane compared to Propofol. The relative hypotension associated with Propofol may be disadvantageous in the elderly and patients with coronary artery disease.

A Thwaites, S Edmends, and I Smith,[7] while comparing the hemodynamic parameters, noted that induction of anaesthesia with Propofol was associated with a decrease of approximately 20 mmHg in MAP, which occurred within 2 minutes and persisted for at least 5 minutes of anaesthesia. In contrast, they noted that the decrease in MAP with Sevoflurane was only 10 mm Hg. The MAP was significantly lower at 2- 5 minutes after induction with Propofol compared with Sevoflurane. Heart rate did not differ significantly between the groups at any time during the induction. In the present study, there is a significant difference in mean arterial pressure during induction and at 1 minute, 2 minutes, and 5 minutes which is comparable in both studies. Heart rate showed a significant difference between the two groups at 1 minute, 2 minutes, and 5 minutes interval after LMA insertion.

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Charles E. Smith et al,[8] compared Sevoflurane – Nitrous oxide (N2O) with a standard technique of Propofol for induction and Isoflurane – N2O for maintenance in 62 adults undergoing elective surgery using the Laryngeal Mask Airway (LMA). Patients received either the standard technique of Propofol for induction and Isoflurane – N2O for maintenance (controls) or Sevoflurane – N2O for both induction and maintenance of general anaesthesia. Measurements – Induction and emergence times, heart rate, blood pressure, oxygen saturation, and end-tidal carbon dioxide were recorded. Heart rate was lower at 5 and 10 minutes after LMA insertion in the Sevoflurane – N2O group (69±3 and 66±3 bpm) versus the control group (81±3 bpm, and 74±3 bpm with $p<0.05$). But in the present study, heart rate at 1 minute, 2 minutes, and 5 minutes interval after LMA insertion showed a fall in the Propofol group compared to the Sevoflurane group.

Priya et al,[9] in their study, randomized patients into one of the two groups (Group P– Propofol and Group S– Sevoflurane) of twenty-five each for induction of anaesthesia. Both groups received IV lignocaine (2 ml of 1 % lignocaine) before induction of anaesthesia. Group P received intravenous Propofol (mean dosage – 2.45 mg/kg body weight) with 100% oxygen via face mask. In Group S, the Magill's circuit was primed with sevoflurane 8% in N2O 50% and O2 (Flow rate – 8 liters/min) for 30 seconds. They were asked to take vital capacity breaths. Loss of eyelash reflex was considered as the endpoint of induction in both the groups. IV Fentanyl (2µg/kg) was injected immediately after the loss of eyelash reflex. Both the groups exhibited stable hemodynamic profiles. Comparison of the hemodynamic parameters (Mean Arterial Pressure, Heart rate) between the two groups showed a statistically significant difference in the Mean Arterial Pressure in group P 3 minutes after induction, but heart rates were comparable in both the groups. However, in the present study, heart rate at 1 minute, 2 minutes, and 5 minutes interval after LMA insertion showed a fall in the Propofol group as compared to the Sevoflurane group and a significant fall in mean arterial blood pressure during induction and 1 minute, 2 minutes and 5 minutes when compared between the two groups.

Ganatra S B et al,[5] in their study, sixty patients were equally and randomly allocated into two groups. Both groups received Fentanyl 1µg/kg. Patients in the Sevoflurane group were induced with 8% Sevoflurane, and those in the Propofol group with Propofol 2.5 mg/kg. Systolic and diastolic arterial pressures were significantly lower in the Propofol group, which is comparable to present study.

In the present study in GROUP-P, the mean time taken for loss of verbal contact was 52.83±11.27, for jaw relaxation was 71.50±12.33 and for LMA insertion was 83.71±12.07. In GROUP – S, the mean time taken for loss of verbal contact was 69.33±9.80, for jaw relaxation was 110.50±13.02 and for LMA insertion was 128.00±13.81.

Sevoflurane group required more time for jaw relaxation and insertion of LMA. Loss of verbal contact, adequate jaw relaxation, and LMA insertion was earlier with Propofol compared to Sevoflurane, and is statistically significant with a p-value of < 0.05 (p-value < 0.01).

Charles E. Smith et al,[8] compared Sevoflurane – Nitrous oxide (N2O) with a standard technique of Propofol for induction, and Isoflurane – Nitrous oxide (N2O) with for maintenance. 62 adults undergoing elective surgery using the laryngeal mask airway (LMA). Patients received either the standard technique of Propofol for induction and Isoflurane – N2O for maintenance (controls) or Sevoflurane – N2O for both induction and maintenance of general anesthesia. Time to loss of consciousness was faster after Propofol (mean±SEM: 51±3 sec) than after Sevoflurane – N2O (85±10 sec; $p < 0.05$). Above findings are comparable to the present study.

Priya et al,[9] in their study, noted that Propofol is known to depress laryngeal reflexes facilitating LMA insertion. They concluded that Propofol is better than Sevoflurane for LMA insertion using the loss of eyelash reflex as the endpoint of induction, probably due to better jaw relaxation. Similarly in the present study, Propofol took lesser time for induction in comparison with Sevoflurane.

Ganatra S B et al,[5] in their study, sixty patients were equally and randomly divided into two groups. Both groups received Fentanyl 1µg/kg. Patients in the Sevoflurane group were induced with 8% Sevoflurane, and those in the Propofol group with Propofol 2.5mg/kg. The mean (± SD) time taken from induction to successful laryngeal mask insertion was significantly shorter with Propofol (68.70±22.60 s) compared with Sevoflurane (149.83±55.25 s). In the present study also, the mean time taken from induction to successful LMA insertion was significantly shorter with Propofol compared with Sevoflurane.

In contrast, Ravi Kumar Kopula, and Anitha Shenoy,[10] in their study, noted that verbal contact and eyelash reflex with sevoflurane was lost earlier when compared to Propofol. But Propofol and Sevoflurane took similar times for jaw relaxation and subsequent LMA insertion. In present study, loss of eyelash reflex was not included, but the time for loss of verbal contact was significantly lesser with the Propofol group. The mean time taken from induction to successful laryngeal mask airway insertion was significantly shorter with Propofol than Sevoflurane.

Shao. G, Zhan G et al,[11] compared the efficacy of Sevoflurane and Propofol induction for LMA insertion in elderly patients. Ninety patients aged above 60 years or more received anesthesia induction with Propofol and with Sevoflurane 8 % using the vital capacity breath (VCB) or tidal volume breath (TVB) techniques. LMA was inserted

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most, less, or least rapidly with Propofol (89±28 s), Sevoflurane 8 % using the VCB (163±34 s) or TVB (205±44 s) techniques, respectively. These results are comparable with present study, wherein LMA insertion was quicker with Propofol as compared to Sevoflurane.

The LMA insertion characteristics, such as jaw opening and ease of insertion, and complications during insertion such as coughing, gagging, laryngospasm, and patient movements, are graded using an 18 point score. All patients in Group P had successful LMA insertion in the 1st attempt. In group S, 26 patients had successful LMA insertion in the 1st attempt, and 4 patients had successful LMA insertion at 2nd attempt. The number of attempts was more in Group S compared to group P, which is statistically significant ($p < 0.05$).

In a similar study conducted by Priya et al,[9] 4 patients in each group (Group P- Propofol and Group S – Sevoflurane) required a second attempt for LMA insertion. In the remaining 21 patients each in both groups, LMA insertion was successful at 1st attempt itself. Conditions for LMA insertion were noted. Excellent conditions were obtained in a significantly greater number of patients in Group P (p -0.02). Analysis of total scores by grading of conditions for LMA insertion indicated that conditions for LMA insertion were superior in Group P. The mean score in Group P was 17.5±0.77 and 16.8±1.15 in Group S and was statistically significant with p – 0.012. Analysis of the individual scores for criteria for LMA insertion and the patient's response indicated that scores for jaw opening in Group P were significantly better than Group S (p-0.047). In present study, the number of attempts were significantly more with Sevoflurane compared to Propofol, and individual scores for criteria of LMA insertion and patient's response indicated that scores for patient movement in Group P were significantly better than Group S.

Ganatra S B et al,[5] in their study, sixty patients were equally and randomly divided into two groups. Both groups received Fentanyl 1μg / kg. Patients in the Sevoflurane group were induced with 8 % Sevoflurane and those in the Propofol group with Propofol 2.5 mg/kg. Excellent or satisfactory conditions were observed in 30 patients (100%) in the Propofol group and in 29 patients (96.66%) in the Sevoflurane group. In present study, the overall conditions for LMA insertion were graded as excellent with a score of 18 in 29 patients of Group P, and 1 patient had a score of 17 with satisfactory LMA insertion grading. 24 patients in the Sevoflurane group had excellent LMA insertion conditions with a score of 18, and 6 patients had satisfactory insertion conditions with a score of 17.

CONCLUSION

Based on the present clinical comparative study, the following conclusion can be made. Sevoflurane is associated with good hemodynamic stability compared to Propofol. Intubating conditions provided by Propofol are superior. Time is required for jaw relaxation is prolonged with sevoflurane when compared to Propofol. This may delay laryngeal mask insertion. Number of attempts for LMA insertion were significantly more with Sevoflurane group. Quality of insertion with Propofol was excellent in all patients. With Sevoflurane, quality of insertion ranged from excellent to satisfactory. Patients who received Propofol complained of pain on injection, and patients who received Sevoflurane complained of odour when the mask was held. Sevoflurane is an acceptable alternative to Propofol for LMA insertion.

REFERENCES

1. Martin S. Bogetz, using the laryngeal mask airway to manage the difficult airway: Anesthesiology Clin N America 2002;20; 863 – 870.
2. Robert G Krohner, Sivam Ramanathan. Anatomy of airway in Benumofs airway management 2nd edition.2006; 1 – 19,476 – 497, 1027 – 29.
3. Brain AIJ: A new concept in airway management; British Journal of anaesthesia.1983; 55: 801 – 805.
4. Joseph R Brimcombe. Laryngeal mask anaesthesia-principles and practice, 2nd edition page 35,41,115.
5. Ganatra SB, D'mello J,Butani M, Jhamnani P "Conditions for insertion of the laryngeal mask airway: comparisions between sevoflurane and Propofol using fentanyl as a co-induction agent. A pilot study" European J Anesth 2004, Apr; 21(4): 265-71.
6. Sharma M, Sinha R, Trikha A, Ramachandran R, Chandralekha C. Comparison of effects of ProSeal LMA™ laryngeal mask airway cuff inflation with air, oxygen, air:oxygen mixture and oxygen:nitrous oxide mixture in adults: A randomised, double-blind study. Indian J Anaesth. 2016 Aug;60(8):566-72.
7. A. Thwaites, S. edmends and I. Smith " Inhalation induction with sevoflurane: a double – blind comparision with propofol" British Journal of Anesthesia 1997: 78: 356- 361.
8. Charles E. Smith et al " Sevoflurane – N2O versus propofol/ Isoflurane – N2O during elective surgery using the LMA in adults" J. Clin Anesth 2000; 12; 392-396.
9. V. Priya et al "Comparision of Propofol versus Sevoflurane for laryngeal mask airway insertion" Indian J Anesthesia 2002; 46 (1) 31-34.
10. Ravikumar Koppula & Anitha Shenoy "Comparision of Sevoflurane with Propofol for laryngeal mask airway insertion in adults" Anesth. Clin Pharmacol 2005; 21(3); 271-274.
11. Shao. G, Zhan G " Comparision of Propofol and sevoflurane for laryngeal mask airway patients in elderly patients" south med J, Apr; 2007,100(4):360.

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