How to Cite:
Singh, H., Dhawan, G., Brar, P. K. S., Bhardwaj, S., Barman, M., & Srivastava, R. (2022). Comparative study of sevoflurane versus propofol for laryngeal mask airway insertion in adults. *International Journal of Health Sciences*, *6*(S2), 9441–9446.
https://doi.org/10.53730/ijhs.v6nS2.7473

Comparative study of sevoflurane versus propofol for laryngeal mask airway insertion in adults

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***Abstract*---**Background: Propofol is a preferred induction agent for laryngeal mask airway (LMA) insertion due to its propensity of suppressing oropharyngeal and cough reflexes. Sevoflurane is a nonpungent inhalation anesthetic agent which can be used as an induction agent. The aim of the present study was to compare Sevoflurane versus Propofol for laryngeal mask airway insertion in adults. Material and methods: The present study was carried out in 300 patients to compare Sevoflurane versus Propofol for laryngeal mask airway insertion in adults. In Group-A: induction with propofol and in Group-B: induction was done with inhalational sevoflurane 8.

Various vital parameters and other clinical parameters were recorded and compared in both the groups. The statistical analysis was done. Results:Propofol needed leser time to loss of eyelash reflex, Time to jaw relaxation, Time to completion of successful insertion of Laryngeal Mask Airway. The percentage of patients who had successful LMA insertion at first attempt was larger with propofol. The duration of apnea was longer in group propofol. Excitatory movement was more in group propofol. Cough, laryngospasm was absent in propofol. Hiccups was absent in both groups. During insertion of LMA, coughing, gagging was absent in group sevoflurane and laryngospasm was absent in propofol. Movements occur in more in propofol patients. Conclusion: The present study concluded that propofol was better than sevoflurane for laryngeal mask airway insertion in adults.

***Keywords*---**laryngeal mask airway, propofol, sevoflurane.

Introduction

In anaesthesia, Laryngeal Mask Airway (LMA) has gained widespread acceptance, as it provides an effective bridge between face mask and endotracheal tube, thereby providing effective (Spontaneous or Controlled) ventilation.[1] It is a simple, well tolerated, safe, reusable and cost-effective device for airway management in both paediatric and adult patients.[2,3] Propofol is considered as the drug of choice for the insertion of LMA because of its depressant effect on airway reflexes.[4] Propofol has several adverse effects including pain on injection, apnea, hypotension and excitatory patient movement.[5] Sevoflurane is a nonpungent inhaled anesthetic with a low blood gas solubility coefficient (0.69)[6] and minimal respiratory irritant characteristics that make it suitable for inhaled induction of anesthesia and insertion of the LMA.[7] Furthermore, sevoflurane, as compared with propofol, has the advantage of providing better hemodynamic stability[8,9] and a smoother transition to the maintenance phase without a period of apnea.[9,10] It allows rapid smooth inhalation induction with excellent recovery characteristics. Hence, inhalation induction of anesthesia with sevoflurane can be alternative to the use of rapidly acting intravenous induction agents.[11] The aim of the present study was to compare Sevoflurane versus Propofol for laryngeal mask airway insertion in adults.

Material and Methods

The present study was carried out in 300 patients between November 2021 and March 2022, to compare Sevoflurane versus Propofol for laryngeal mask airway insertion in adults. Pre-anesthetic examination of patients was done a day prior to the surgery. Patients were randomly divided into 2 groups, Group-A and Group-B, comprising of 150 patients each. In Group-A: induction with propofol 3 mg/kg intravenously over 30 seconds with Lidocaine 0.3 mg/kg. In Group-B: induction was done with inhalational sevoflurane 8% and nitrous oxide 50% in oxygen. Various vital parameters like pulse rate, blood pressure changes, respiration rate, and SPO_2 % of all patients were recorded in case record form. Other clinical parameters like loss of eyelash reflex, jaw relaxation, and time to

successful LMA insertion after giving the drug were also recorded and compare in both the groups. The statistical analysis was done with the help of Excel and SPSS 16 trial version.

Results

In this study, mean age in the Group-A was 28.7±8.31years and in the Group-B was 29.2±8.46 (p>0.05). The mean weight in Group-A was 58.11±3.29 Kg and in Group-B was 58.48±4.12, (p>0.05). The males were more in both groups, in Group-A was 64% participants were males and in Group-B 53.33% were males. Patients in group B had a longer time to loss of eyelash reflex, Time to jaw relaxation, Time to completion of successful insertion of Laryngeal Mask Airway as compared with patients in group A. The percentage of patients who had successful LMA insertion at first attempt was larger in group A as compared to group B. Only 1 attempt needed for insertion of the LMA in group A wheras 2 attempts were needed in group B. However, more patients required additional propofol for successful insertion in group A as compared with group B. The duration of apnea was longer in group A as compared to group B, and the incidence of apnea was more frequent in group A as compared to group B.The overall incidence of complications related to induction of anesthesia, such as excitatory movement was more in group A than group B. Cough, laryngospasm was present in group B whereas absent in group A. Hiccups was absent in both groups. During insertion of LMA, coughing, gagging was absent in group B and laryngospasm was absent in group A. Movements occur in more in group A patients.

Table 1: Demographic detail

Variables	Group A	Group B	p-value
Mean age(yrs)	28.7±8.31	29.2±8.46	>0.05
Gender			
Male	96 (64%)	80(53.33%)	
Female	54(36%)	70(46.66%)	
Weight(Kg)	58.11±3.29	58.48±4.12	>0.05

Table 2: Characteristics of Laryngeal Mask Insertion

Variables	Group A	Group B	p-value
Time to loss of eyelash reflex (s)	38.4±9.9	44.54±12.2	<0.001
Time to jaw relaxation (s)	74±15	141±34	
Time to completion of successful insertion of Laryngeal Mask Airway (s)	85±22	161±43	
Successful insertion of Laryngeal Mask Airway at first attempt	93(62%)	70(46.66%)	
Apnea duration (s)	176± 186	29±115	

Incidence of apnea	120(80%)	12(8%)	
Number of attempts	1	2	
Additional propofol	75(50%)	20(13.33%)	

Table 3. Incidence of Complications During Induction of Anesthesia and Laryngeal Mask Airway Insertion

Variables	Group A	Group B	p-value
Complications during induction			NS
Excitatory movements	10	5	
Cough	0	5	
Laryngospasm	0	3	
Hiccup	0	0	
Complications during laryngeal mask airway insertion			
Coughing	2	0	
Gagging	2	0	
Laryngospasm	0	4	
Movements	18	7	<0.05

Discussion

Satisfactory insertion of LMA after induction of anaesthesia requires sufficient depth of anaesthesia.[12] Propofol is a common intravenous anaesthetic agent used for LMA insertion, because of its greater depressant effect on airway reflexes. Sevoflurane is suitable for inhalational induction technique even 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.[13]

In this study, mean age in the Group-A was 28.7±8.31years and in the Group-B was 29.2±8.46 (p>0.05). The mean weight in Group-A was 58.11±3.29 Kg and in Group-B was 58.48±4.12, (p>0.05). The males were more in both groups, in Group-A was 64% participants were males and in Group-B 53.33% were males. Patients in group B had a longer time to loss of eyelash reflex, Time to jaw relaxation, Time to completion of successful insertion of Laryngeal Mask Airway as compared with patients in group A. The percentage of patients who had successful LMA insertion at first attempt was larger in group A as compared to group B. Only 1 attempt needed for insertion of the LMA in group A wheras 2 attempts were needed in group B. However, more patients required additional propofol for successful insertion in group A as compared with group B. The duration of apnea was longer in group A as compared to group B, and the incidence of apnea was more frequent in group A as compared to group B. The overall incidence of complications related to induction of anesthesia, such as excitatory movement was more in group A than group B. Cough, laryngospasm was present in group B whereas absent in group A. Hiccups was absent in both groups. During insertion of LMA, coughing, gagging was absent in group B and laryngospasm was absent in group A. Movements occur in more in group A patients.

Ti LK et al compared the ease of insertion of the laryngeal mask airway in adults after induction of anesthesia with either a sevoflurane vital capacity breath technique or propofol IV and concluded that sevoflurane compares favorably with propofol, although prolonged jaw tightness may delay laryngeal mask airway insertion.[14]

Siddik-Sayyid SM et al investigated the incidence of successful insertion of laryngeal mask airway (LMA) at the first attempt and the incidence of side effects after LMA insertion using the combination of sevoflurane and propofol as compared with either sevoflurane or propofol alone for induction of anesthesia. The coinduction technique was associated with the most frequent incidence of successful LMA insertion at the first attempt (93.5%) than either sevoflurane alone (46%) or propofol alone (61.5%). Propofol-induced induction of anesthesia allowed the fastest insertion of LMA and was associated with the least frequent incidence of postoperative nausea and vomiting. However, this advantage of propofol was offset by a frequent incidence of pain on injection (69%) and the occurrence of movements during insertion of the LMA (50% in the propofol group versus 19% and 26% in the sevoflurane and sevoflurane-propofol groups, respectively, as well as a more frequent incidence of apnea (84% in the propofol group versus 7% and 16% in the sevoflurane and sevoflurane-propofol groups, respectively.[15]

Patel B et al compared the quality of the condition provided for successful LMA insertion by sevoflurane induction with propofol induction methods. The mean time to successful LMA insertion in Group-P was 79.4±27.63 seconds and in Group-S, it was 128.5±19.46 seconds, $p<0.001$. Comparing the groups, the difference between both the groups was highly statistically significant. The mean time to successful LMA insertion was faster in Group-P compared to Group-S. In Group-P, in 40 (80%) patients, LMA insertion was done in the first attempt within the mean time of 68.12±12.14 seconds while in Group-S, in 32 (64%) patients, LMA was inserted in the first attempt within the mean time of 117.6±14.41 seconds. Comparing both groups, this difference was highly significant $p<0.001$. The second attempt was required in 8 (16%) patients in Group-P with the mean time of LMA insertion of 120.6 seconds compared to in 14 (28%) patients in Group-S with a mean time of LMA insertion of 143 seconds while comparing both the groups.[16]

Conclusion

The present study concluded that propofol was better than sevoflurane for laryngeal mask airway insertion in adults.

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