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**ORIGINAL ARTICLE**

# Comparison of Excellent Outcome of Laryngeal Mask Airway Insertion with Sevoflurane Versus Propofol as Induction Agent in Patients Undergoing Elective Surgeries under General Anesthesia

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## ABSTRACT

**Objective:** To compare the excellent outcome of laryngeal mask airway insertion with sevoflurane versus propofol as induction agent in patients undergoing elective surgery under general anesthesia.

**Study Design:** Randomized control trial.

**Study Setting:** was conducted at Department of Anesthesia, Sir Ganga Ram Hospital, Lahore from November 2020 to April 2021.

**Materials and Methods:** Using a random number table, patients were randomised into two groups at random. Group A was given up to 2.5 mg/kg of propofol intravenously while breathing 100% oxygen through a face mask. The anaesthetic circuit in Group B was primed for 30 seconds with Sevoflurane 8% IN N2O 50% and O2 (flow rate 8 liter/minute).

**Results:** In our study the mean age of the patients was 33.89±9.64 years. 70% patients were males and 30% patients were females. The study results showed the excellent outcome was observed in 70.50% patients and it was not observed in 29.50% patients.

**Conclusion:** Our study results concluded that the Sevoflurane is a safe and reliable anesthetic compared with currently available Propofol agent in patients undergoing elective surgery under general anesthesia.

**Keywords:** General Anesthesia, Sevoflurane, Propofol, Mallampati, Laryngeal Mask Airway, LMA

## INTRODUCTION

The Laryngeal Mask Airway (LMA) is a supraglottic airway device that permits regulated ventilation at a low amount of positive pressure while providing a steal around the laryngeal region for spontaneous breathing.[1,2] LMA use has increased as a result of the growing emphasis on day case anaesthesia as an alternative to face mask and as a substitute in difficult airways management. To avoid gagging coughing and laryngospasm during insertion of LMA, adequate depth of anesthesia is required.[3,4]

Various anesthesia agents such as thiopentone, propofol, ketamine, etomidate, halothane and sevoflurane have been used for insertion of LMA. When inserting LMAs, propofol is commonly utilised. Despite the fact that this method has a low rate of failure, it has its limits.[5] These are pain at site of injection, involuntary movements and risk of contamination as well as its high cost.[6]

A variety of supplementary drugs have been used to find a compound which improves the conditions during LMA insertion e.g., Midazolam, Narcotics, Succinylcholine and sevoflurane. For LMA insertion use of Succinylcholine with propofol has disadvantage of postoperative myalgia. As the latest halogenated volatile anaesthetic drug, Sevoflurane is pleasant-smelling and blood-gas solubilized, allowing easy inhalational generation and fast recovery after sedation.[7,8]

One study has shown that excellent results were observed in 100% patients in the group of sevoflurane and (89.5%) in the group of propofol, and the difference was statistically significant ($p<0.05$).[9] But one study showed that Excellent conditions were observed in 6 (24%) in the group of propofol and 9 (36%) in group of sevoflurane, but the difference was statistically insignificant ($p=0.3545$).[10] Another study has shown that propofol is better than sevoflurane i.e. in sevoflurane group 46% patients has successful LMA insertion at first attempt while in 61.5% with propofol ($P < 0.001$).[11]

Literature is evident that sevoflurane is better than propofol but due to controversy, propofol is preferred. Moreover, local magnitude is not available which can help us to implement the use of sevoflurane instead of propofol. So through this study we want to confirm that whether sevoflurane is better or propofol. This will help to improve our knowledge and practice.

## MATERIAL AND METHODS

After taking permission from Institutional Review Board of the hospital this randomized controlled trial was conducted at department of Department of Anesthesia, Sir Ganga Ram Hospital, Lahore from from November 2020 to April 2021. Informed written consent was obtained from the patients. The two hundred sample size was estimated having power of test to be 80%, significance level to be 5% and taking probable proportion of excellent outcome of 100% in sevoflurane and 89.5% in propofol group patients. Patients of both genders having age between 16-50 years with ASA (American society of anesthesiologists) physical status I & II undergoing elective day care surgical procedures were included in this study. Patients having pre-operative sore throat (on clinical examination presence of pharyngitis, and redness), pregnancy, patients with difficult airway i.e., mallampatti class 3 or 4 on clinical examination, patient with history of drug (propofol or sevoflurane) allergy and diagnosed hiatal hernia (on medical record) were excluded from the study.

Random number tables were used to separate patients into two groups. Using a face mask, Group A got Propofol up to 2.5 mg/kg intravenously and 100% oxygen. For 30 seconds, Sevoflurane 8% IN N2O 50% and O2 (flow rate of 8 Liter/minute) were used to prime the anaesthetic circuit in Group B. In order to link the primed circuits to the face mask, we requested each patient to exhale as much as possible before doing so. Breaths of vital capacity were required of them. Both groups viewed the loss of verbal contact to be the end of induction. An expert anesthesiologist attempted to place a Laryngeal Mask Airway. Excellent LMA insertion was labeled if Laryngeal Mask Airway was inserted in 1st attempt with full mouth opening after induction of induction agent, confirmed by End Tidal $CO_2$ and bilateral chest auscultation for air entry. Anesthesia was maintained by using N2O 50% + O2 50% and Sevoflurane 1.5% in both groups.

SPSS version 19.0 was used to enter and evaluate the data. The age of the patients were presented by mean and standard deviation. Gender and excellent LMA insertion was presented by frequency and percentage. Data was stratified for age, gender, ASA class (I or II), Mallampati class (I or II) to deal with effect modifiers. Post-stratification, chi-square test was applied to

compare excellent outcome in both groups taking P-value≤0.05 was considered as significant.

## RESULTS

As indicated in Table 1, the patients' average age was 33.89 ±9.64 years, with minimum and maximum ages of 18 and 50 years, respectively. Seventy percent of the 200 patients were men, whereas thirty percent were women. The patients' male to female ratio was 2.3:1. Table 2 shows the descriptive statistics for class I ASA, Mallampati score, LMA insertion in first try, and full mouth opening. There were 141 patients who participated in this trial, and great outcomes were discovered in 54 cases involving the sedative Propofol and 87 cases including sevoflurane. There was a significant statistical difference between the trial groups, and the patients had great outcomes. Table 3 shows that the p-value is 0.000, i.e. Table 4 compares the outstanding outcomes of the two study groups, stratified by age, gender, ASA, and Mallampati score, for both groups.

Table 1: Descriptive statistics for age of the enrolled patients

| | | |
|---|---|---|
| Age (years) | n | 200 |
| | Mean | 33.89 |
| | SD | 9.64 |
| | Minimum | 18.00 |
| | Maximum | 50.00 |

Table 2: Frequency distribution of ASA, Mallampati score and full mouth opening

| Parameters | Sub-class | Frequency | Percent |
|---|---|---|---|
| ASA | Class I | 128 | 64.0 |
| | Class II | 72 | 36.0 |
| Gender | Male | 140 | 70.0 |
| | Female | 60 | 30.0 |
| Mallampati score | One | 160 | 80.0 |
| | Two | 40 | 20.0 |
| Full mouth opening | Yes | 159 | 79.5 |
| | No | 41 | 20.5 |

Table 3: Comparison of excellent outcome in both study groups

| Variable | | Study Groups | | Total |
|---|---|---|---|---|
| | | Propofol | Sevoflurane | |
| Excellent Outcome | Yes | 54 | 87 | 141 |
| | No | 46 | 13 | 59 |
| Total | | 100 | 100 | 200 |

Table 4: Comparison of excellent outcome in both study groups stratified by age, gender, ASA, Mallampati score

| Variables | Outcomes | | | Study Groups | | Total | p-value |
|---|---|---|---|---|---|---|---|
| | | | | Group A | Group B | | |
| Age (years) | Excellent outcome | <25 | Yes | 16 | 19 | 35 | 0.017 |
| | | | No | 13 | 3 | 16 | |
| | | ≥25 | Yes | 38 | 68 | 106 | 0.000 |
| | | | No | 33 | 10 | 43 | |
| Gender | Excellent outcome | Male | Yes | 40 | 56 | 96 | 0.000 |
| | | | No | 37 | 7 | 44 | |
| | | Female | Yes | 14 | 31 | 45 | 0.046 |
| | | | No | 9 | 6 | 15 | |
| ASA | Excellent outcome | Class I | Yes | 33 | 57 | 90 | 0.000 |
| | | | No | 30 | 8 | 38 | |
| | | Class II | Yes | 21 | 30 | 51 | 0.007 |
| | | | No | 16 | 5 | 21 | |
| Mallampati score | Excellent outcome | One | Yes | 40 | 74 | 114 | 0.000 |
| | | | No | 35 | 11 | 46 | |
| | | Two | Yes | 14 | 13 | 27 | 0.007 |
| | | | No | 11 | 2 | 13 | |

## DISCUSSION

In our study the excellent outcome was observed in 141 (70.50%) patients in whom 54 cases were from Propofol group and 87 were from Sevoflurane group. In our study excellent outcome in most of the cases was approaches by Sevoflurane group as compared to propofol group. Statically highly significant difference was observed between the study groups and excellent outcome of LMA i.e. p-value=0.000.

Molloy et al resulted in their study thatIn all groups, the LMA was successfully placed in all patients within 3 minutes. In most cases, sevoflurane 8 percent modified vital capacity breath inhalational induction is effective for LMA installation, but it takes somewhat longer than propofol.[12] One study found that sevoflurane produced great results in 100% of patients while propofol produced excellent results in 89.5 percent of patients, with a significant difference (P<0.05).[9]

But one study showed that Excellent conditions were observed in 6 (24%) in the propofol group and 9 (36%) in sevoflurane group, but the difference was insignificant (p=0.3545).[10] For LMA insertion in adults, sevoflurane has been compared well with propofol and found to be a safe, reliable option.[13,14] Kati et al demonstrated in their study that compared to propofol, sevoflurane has a decreased risk of apnea during anaesthesia induction. Propofol's other complication rates aren't higher, but the prolonged induction time is a drawback.[15]

On contrary Priya et al described that the In comparison to the Sevoflurane group, more patients in the Propofol group (64 percent) had excellent circumstances for LMA implantation (32 percent ). 16 Protocol is superior than sevoflurane for the insertion of the LMA, as demonstrated by Soomro and colleagues. There was no statistically significant difference between the groups in terms of LMA insertion (p-values=0.245).[17] Another study has shown that propofol is better than sevoflurane i.e. in sevoflurane group 46% patients has successful LMA insertion at first attempt while in 61.5% with propofol (P < 0.001).[11]

The study results of our study showed that the LMA insertion in 1st attempt was successful in 70.50% patients and it was unsuccessful in 29.50% patients. 93 percent of sevoflurane and 83 percent of propofol insertions were effective at the first try, according to Vora et al. Sevoflurane was faster (1.26±0.36; 2.76±0.51; 5.16±1.6 minutes) when it came to LMA insertion and removal whereas propofol took much longer (1.362+0.22, 5.89+1.23, 12.3+3.19) (P<0.0001).[18] Compared to groups S, less attempts were made with the P group, according to other research.[16] If this is the case, it may be because sevoflurane has already primed the circuit and the propofol induction dose needs to be re-evaluated.

## CONCLUSION

Our study results concluded that the Sevoflurane is a safe and reliable anesthetic compared with currently available Propofol agent in patients undergoing elective surgery under general anesthesia.

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