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Original Research Article

A Prospective Study to Compare Sevoflurane and Propofol for Laryngeal Mask Airway Insertion

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Abstract:

Introduction: The laryngeal mask airway (LMA) is frequently employed to facilitate airway management. A study was conducted to compare the incidence of respiratory complications, including laryngospasm, hear rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP) with the use of sevoflurane and propofol.

Methods: It was a prospective study conducted in the government Medical College, Rajamahendrawaram between May to July 2023. Study protocol was approved by the institutional ethics committee. Informed written consent was taken from all the participants. Individuals ≥ 18 years, both gender with those admitted for different surgeries, require general anaesthesia (GA) admitted in the general surgery department were included. All patients maintained a nil per oral status. The study members were divided in to 2 groups: group P and group S. Group P received propofol at a dosage of 2.5 mg/kg body weight, administered at a rate of 40 mg every 10 seconds. Loss of verbal contact was evaluated based on the patient's response to their name being called. LMA insertion was attempted once satisfactory jaw relaxation was achieved. In addition to the complications various parameters such as number of attempts for successful LMA, meantime, HR, SBP, DBP were considered. T test was used for statistical analysis, P value < 0.05 was considered significant.

Results: Total 100 members, 50 each group. Statistically there was no significant difference in mean number of attempts. Group P members demonstrated statistically significant earlier loss of verbal contact and loss of eyelash reflex. Except mean HR, Statistically there was significant difference in the mean SBP and DBP, respectively in groups.

Conclusion: The duration needed for achieving jaw relaxation and the overall conditions of LMA insertion were comparable in both groups. However, when considering the loss of eyelash reflex and loss of verbal contact, group P members demonstrated superiority over group S.

Keywords: Mean, study, laryngeal, Significant.

Introduction

The laryngeal mask airway (LMA) is frequently employed to facilitate airway management, particularly in emergency situations. Positioned at the supraglottic level, the LMA effectively envelops the larynx, ensuring prompt ventilation. [1] The LMA has been practised on many individuals and is widely acknowledged as a secure method in various surgical procedures. [2] It offers superior airway control compared to a facemask, allowing anesthetists to have hands-free operation while circumventing the drawbacks associated with endotracheal tubes, such as presser responses during intubation and postoperative issues like sore throat, croup, and hoarseness. Additionally, the LMA presents a straightforward and effective solution to challenges related to difficult intubation. Its use eliminates the need for muscle relaxation, avoids laryngoscopy, and minimizes hemodynamic changes during insertion.

Due to its favorable recovery profile and minimal side effects, propofol has emerged as the preferred drug for LAM insertion. However, it is noteworthy that propofol administration may be linked to injection pain as well as cardiovascular, respiratory depression. [3] Sevoflurane, a volatile halogenated anesthetic agent, is known for nonirritating properties to the airways. Mask induction with sevoflurane is associated with a minimal incidence of breath holding, coughing, and laryngospasm. Furthermore, low lipid solubility is another utility.

The induction technique involving a high inspired concentration of sevoflurane and vital capacity breaths creates optimal conditions for the insertion of the LMA. [4]

With these, a study was conducted with an aim to compare the incidence of respiratory complications, including laryngospasm, coughing, hear rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP) associated with the use of sevoflurane and propofol.

Methods:

It was a prospective study conducted in the government Medical College, Rajamahendrawaram. Study was conducted between May to July 2023. Study protocol was approved by the institutional ethics committee. Informed written consent was taken from all the participants. Individuals $\geq$ 18 years, both gender with those admitted for different surgeries, require general anaesthesia (GA) admitted in the general surgery department were included in the study. Paediatric age group, non-cooperative individuals were not considered in this research.

After admission in the study, all the members were evaluated clinically and findings were recorded in the study proforma. All patients maintained a nil per oral status. Prior to the procedure, patients were premedicated with a tablet of Ranitidine (150 mg) and a tablet of Ondansetron (4 mg), administered 6 hours before the scheduled time. The study members were divided in to 2 groups: group P and group S. Group P received propofol at a dosage of 2.5 mg/kg body weight, administered at a rate of 40 mg every 10 seconds. In contrast, Group S was exposed to Sevoflurane at an 8% concentration introduced into 8 L per minute flow of oxygen, with an instruction to inhale and hold the substance for as long as possible.

The commencement of propofol injection or the introduction of 8% sevoflurane marked the starting point for induction. Loss of verbal contact was evaluated based on the patient's response to their name being called. The desired endpoint for induction in both methods was the loss of the eyelash reflex. Subsequently, an anesthesiologist assessed jaw relaxation. If the initial relaxation was deemed insufficient, reassessment occurred every 10 seconds. LMA insertion was attempted once satisfactory jaw relaxation was achieved. In addition to the complications various parameters such as number of attempts for successful LMA, meantime, hear rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP) were considered.

Statistical Analysis: Simple descriptive statistics like mean and percentage were used for analysis. Data was analysed using SPSS version 21. T test was used for statistical analysis, P value < 0.05 was considered significant.

Results:

Total 100 members, 50 (100%) in each group, respectively. The mean number of attempts were 1.01 and 1.21, respectively in the groups; statistically there was no significant difference ($P < 0.05$). Propofol demonstrated statistically significant earlier loss of verbal contact and loss of eyelash reflex. The remaining variables exhibited almost similar results in both groups, and there was not statistically significant difference. Full jaw relaxation and ease in inserting the LMA were observed in 96.7% of the subjects in both study groups. Except mean HR, Statistically there was significant difference in the mean SBP and DBP, respectively in groups.

Discussion:

Airway management poses a challenging task for every anesthesiologist. LMA was introduced by British anesthesiologist Dr. Archi Brain in 1988, which has since found widespread use in extensive surgical procedures. The LMA has become a valuable tool in the anesthesiologist's toolkit, particularly in addressing difficult airway situations. [5] The insertion of LMA is reported to be linked with fewer hemodynamic changes compared to endotracheal intubation. [6] A successful insertion of the LMA following anesthesia induction necessitates an adequate depth of anesthesia. Propofol is a frequently employed intravenous anesthetic agent for the insertion of the LMA, owing to its potent depressant effect on airway reflexes. Sevoflurane, characterized by low blood gas solubility and minimal respiratory irritant effects, is suitable for inhalational induction even in high concentrations. The vital capacity induction technique using sevoflurane was implemented to align the approach with the intravenous bolus injection of propofol. [7, 8]

In this research the mean number of attempts were 1.01 and 1.21, respectively in the groups; statistically there was no significant difference ($P < 0.05$). Propofol facilitated a quicker and more successful insertion of the LMA, requiring fewer attempts compared to sevoflurane. Our study revealed satisfactory LMA insertion conditions for patients in group S and group P; there was no statistical significance ($P = 0.532$). This was effectively addressed by administering a rescue dose of propofol tailored to the individual patient's needs. [9] In the study conducted by Dhande K et al. [10] it was observed that patients in the group S required more attempts for the insertion of the LMA compared to those in the group P. Group P members demonstrated statistically significant and earlier loss of verbal contact and loss of eyelash reflex, respectively ($P< 0.021$ and 0.032). Similar view was opined in the literature. [11]

In this research statistically there was no significant difference in the mean HR between the groups. Similar view was opined was in the literature. [12] Whereas statistically there was significant difference respectively in the groups in the mean SBP and DBP. But statistically there was no significant difference was reported in the literature between groups. [13]

The duration needed for achieving jaw relaxation and the overall conditions of LMA insertion were comparable in both groups. However, when considering the loss of eyelash reflex and loss of verbal contact, group P members demonstrated superiority over group S. Sevoflurane offered an LMA insertion condition of comparable quality while optimizing hemodynamic stability. Therefore, it can be considered a viable and acceptable alternative to Propofol.

Results:

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