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ORIGINAL RESEARCH ARTICLE

COMPARISON OF EFFICACY OF PROPOFOL AND SEVOFLURANE FOR LARYNGEAL MASK AIRWAY INSERTION DURING ELECTIVE SURGERIES.

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ABSTRACT

This study was conducted in the Department of Anesthesiology, Holy Family Hospital Rawalpindi from 5 October 2011 to 5 April 2012 after approval of hospital ethics committee. Three hundred and eighteen patients fulfilling the inclusion criteria were selected in the study by non-probability consecutive sampling after taking informed written consent. Patients between the ages of 20 to 40 years were included, belonging to ASA class I and II, requiring General Anesthesia with Laryngeal Mask Airway for different surgical procedures. They were divided into two equal groups by computer generated random numbers. Group A comprised of one hundred and fifty eight patients in whom intravenous propofol was given for induction of anesthesia and Laryngeal mask insertion. Group B comprised of one hundred and fifty eight patients in whom inhalational induction with sevoflurane was done for Laryngeal mask insertion. Conduct of anesthesia was maintained similar in both groups. Cough and gag reflexes were observed in both groups at the time of Laryngeal mask insertion. Drug under study was said to be effective, if it is associated with no cough and gag reflex during Laryngeal mask insertion. All the data was analyzed by SPSS version 15. It was observed that 6.3% patients of group A (propofol) had positive cough reflex as compare to 13.2%% patients of group B (sevoflurane). The difference was statistically significant (p=0.038). While the incidence of gag reflex in group A was 8.2% and group B was 14.5%. But the difference was not found to be statistically significant (p=0.077). Propofol is more effective than sevoflurane for smooth LMA insertion during elective surgeries.

Key words: *Cough reflex, Gag reflex, Laryngeal Mask Airway Insertion, Propofol, Sevoflurane*

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INTRODUCTION

The most important responsibility of an anesthesiologist is control of patients' airway.[1,2] Thorough understanding of airway management necessitate sound knowledge of airway anatomy, different equipments used in the airway management, techniques and associated complications.[1,2,3]

Maintaining patients' airway with face mask is a simplest technique but the drawback to the face mask connection is that there is no easy way to make and maintain a reliable seal especially for long procedures.[4,5,6] Invention of endotracheal tube (ETT) is a great revolution in the history of anesthesia.[1] Endotracheal intubation was considered to be the best way of securing patients' airway and delivering anesthetic gasses to the patients during general anesthesia.[1,2] It also provides protection against risk of aspiration. However laryngoscopy and endotracheal intubation violate the patients' protective airway reflexes, soft tissue trauma and also leads to tachycardia and hypertension due to sympathetic overactivity.[7]

Nowadays, endotracheal intubation is increasingly being replaced by Laryngeal Mask Airway (LMA) in cases where intubation is difficult or in procedures where aspiration is not a problem.[8,9]

Laryngeal mask airway (LMA) is a supraglottic device.[10] It has been used safely and effectively in

spontaneous as well as controlled ventilation.[11] It has proved to be a very useful airway device both in adults and children.[12] In a wide variety of clinical situation, it is a good alternative to the face mask and endotracheal intubation.[12] In the difficult airway management, LMA facilitates blind and fibreoptic techniques of intubation.[12,13] Adequate suppression of airway reflexes is mandatory for smooth insertion of LMA and to avoid undesired responses of airway like coughing gagging and laryngospasm.[14,15] LMA insertion is associated with less airway stimulation, tachycardia, hypertension, post operative pharyngeal discomfort and dysphonia as compare to endotracheal intubation, as it does not stimulate the trachea which is considered to be one of the most sensitive parts of the body.[4] Untoward effects associated with LMA insertion include gastroesophageal reflux, aspiration bronchospasm and laryngospasm.[16]

LMAs are available in different sizes for different age groups depending upon their weight. Both disposable and reusable versions are available. Many types of LMAs are being used depending upon the indication for use. Examples include LMA classic, flexible LMA, LMA proseal, intubating LMA like Fastrach, LMA supreme, Ctrach and I-gel.[17]
Both intravenous and inhalational agents have been used for LMA insertion like propofol, thiopentone, etomidate and sevoflurane. Among these, propofol and sevoflurane are most commonly used agents for LMA insertion.[17, 18]

Propofol (2,6-diisopropofol), a phenol derivative, is an intravenous anesthetic agent with properties of rapid induction and recovery.[18, 19] It is commonly used for induction and maintenance of general anesthesia and sedation in intensive care units.[20] Intravenous propofol (1%) has been used as induction agent of choice for LMA insertion.[18,19] It allows smooth insertion of LMA by suppressing unwanted airway reflexes adequately [18,19]. In spite of these advantages, propofol has got some side effects including hypotension, pain on injection and excitatory patient movements.[19, 20]

Sevoflurane is a non-pungent volatile inhalational anesthetic agent.[21] It is characterized by smooth and rapid induction and emergence in both children and adults.[19] These properties make sevoflurane a good agent for LMA insertion. Sevoforane induction is now used as an alternative to intravenous induction during LMA insertion. [18, 19]

Limited studies have been conducted on this topic and the available data is not very much conclusive. We have conducted this randomized clinical trial in holy
family hospital, comparing the efficacy of propofol and sevoflurane in attenuating upper airway reflexes like cough and gag during LMA insertion. The purpose of this study was to see which drug is more effective in controlling these untoward responses more efficiently so that a better pharmacological agent can be used in future. This study may also prove a local reference to make a guideline for routine use of these agents with better outcome in anesthetic practice.

METHODS

A randomized control trial study was conducted at department of Anesthesia, Holy Family Hospital, Rawalpindi over a period of six months from 5th October 2011 to 5th April 2012. A total of 318 patients of ASA 1 and II, aged 20-40 and undergoing elective surgeries were included. Patients with pharyngeal pathology e.g. abscess or pharyngeal obstruction, diabetes mellitus, low pulmonary compliance (restrictive airway disease), Pregnancy, gastro esophageal reflux disease, hiatus hernia, history of drug allergy to any anesthetic agent and all emergency surgeries were excluded from the study.
Patients were divided in to two groups “A”or “B” using computer generated random numbers. All patients were assessed a day before surgery and written informed consent was taken. After arrival in operation theatre, heart rate, non-invasive blood pressure, oxygen saturation and electrocardiography were monitored. Intravenous fluids were administered to each patient as per requirement of patient and procedure. All the patients were preoxygenated with 100% oxygen via face mask for 3 minutes. Injection midazolam 0.03mg/kg IV and injection nalbuphin 0.15mg/kg IV were administered to all patients at the time of induction.
Group “A” received IV propofol (1%) 2.0mg/kg at the rate of 5ml/10second along with 100% oxygen via face mask. Patients in Group “B” received a mixture of sevoflurane 8% with 100% oxygen at flow

rate of 8L/min. Patients in both groups were asked to open their eyes after every five seconds. Loss of consciousness was considered when the patients were no longer open their eyes on verbal command. This was assured with absent eyelash reflex and jaw relaxation. Loss of eyelash reflex and jaw relaxation was considered as end point of induction. At this point appropriate sized LMA (according to body weight) was inserted by the principle investigator in all patients, who was blinded to anesthetic technique. Principle investigator remained outside the operating room during initial induction period and called for LMA insertion after endpoint of induction was achieved. For unsuccessful LMA insertion, operator left the operating room and was recalled for LMA insertion after repeat administration of propofol 0.5mg/kg or sevoflurane 8%. LMA was inserted successfully in all the patients.

Heart rate and blood pressure was recorded before induction (baseline). Airway response to LMA insertion including cough and gag reflexes were noted during LMA insertion and were categorized as "Yes" or "No". After successful LMA insertion anesthesia was maintained as per requirement of the surgery.

Data was collected on a structured Performa and SPSS 15 version was used to analyze data. Means and SD were calculated for continuous variables i.e. age and weight. Frequency and percentage were calculated for categorical variables i.e gender, cough and gag reflex. Chi square test was used to compare the efficacy of drugs in two groups. P value <0.05 was considered statistically significant.

RESULT

In this study a total of 318 patients were included randomly and divided into two equal groups of 159 each according to computer generated random numbers.

The mean age of the patient under study was 32.42 ±6.288years. The mean age of the patients in group A and B were 32.28±6.221 and 32.55±6.372 years respectively and was statistically not significant. The mean weight of the patient under study was 70.69 ±7.832 kgs. The mean weight of the patients in group A and B were 70.43±7.541 and 70.94±8.128 kgs respectively and was statistically not significant (p-value 0.232).

Out of total 318 patients, 150 (47.2%) patients were male and 168 (52,8%) were female. Out of 159 patients in each group, the number of male patients in group A were 74 (46.5%) and in group B were76 (47.8%). While the number of female patients in group A were 85 (53.5%) and in group B were 83 (52.2%). Gender difference among the two groups is not statistically significant (p value 0.822).

The frequency of the cough reflex was compared at the time of LMA insertion, among two groups. Out of total 318 patients under study, 31 patients had positive cough reflex which constitute 9.7% of all the patients under study. 10 (6.3%) patients had positive cough reflex in group A while it was 21 (13.2%) in group B during LMA insertion. Thus the frequency of patients with positive cough reflex was almost two times in group B as compare to group A, which was statistically significant (p-value 0.038).

Out of total 318 patients under study, 36 patients had positive gag reflex which constitute 11.3% of all the patients under study. 13 (8.2%) patients showed positive gag reflex in group A while in group B, 23 (14.5%) patients had positive gag reflex. Although the frequency of patients with positive gag reflex was found to be more in group B as compare to group A, but it was not found to be statistically significant (p-value 0.077).

Incidence of cough reflex was found to be greater in sevoflurane group as compare to propofol group and the difference was statistically significant. Although male patients under study had greater frequency of coughing during LMA insertion as compare to females but, was not statistically significant. Incidence of gag reflex was found to be more in sevoflurane group as compare to propofol group but the difference was not statistically significant. However more male patients had positive gag reflex during LMA insertion as compare to females and the difference was statistically significant.

DISCUSSION

Propofol is the most popular induction agent for smooth LMA insertion.[17] LMA may be inserted with or without use of muscle relaxants, but adequate

suppression of upper airway reflexes is mandatory to avoid unwanted responses like coughing, gagging and laryngospasm.[14] Propofol when used as an induction agent for LMA insertion has advantages of rapid onset and short duration of action and adequate suppression of upper airway reflexes.[18] Recently sevoflurane is being used as an alternative to propofol as an inhalational agent of choice because of its smooth induction and recovery characteristics, little excitatory phenomenon and better hemodynamic stability as compare to propofol.[21] Many studies have been conducted to compare the two drugs as induction agent for LMA insertion.

Most of them have been focused on comparison of hemodynamic stability.[18, 19, 20] Very limited data is available on comparison of respiratory complications like coughing, gagging and laryngospasm associated with these agents during LMA insertion. The current study was hypothesized that propofol is more effective in suppressing the upper airway reflexes like coughing and gagging as compare to sevoflurane during LMA insertion. Incidence of coughing and gagging was noted in both groups. The results of our study show that the incidence of adverse responses was greater in sevoflurane group as compare to propofol group.

CONCLUSIONS

Propofol is more effective than sevoflurane for smooth LMA insertion during elective surgeries.

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CONFLICT OF INTERESTS

There are no conflicts of interests and there is nothing to declare.

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